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Our animal anatomy

by

Camille Meyers

A thesis submitted to the graduate faculty

in partial fulfillment of the requirements for the degree of

MASTER OF FINE ARTS

Major: Creative Writing and Environment

Program of Study Committee:
Debra Marquart, Major Professor
David Zimmerman
Brianna Burke
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Iowa State University

Ames, Iowa

2017

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PREFACE

The poetry and creative nonfiction essays of *Our Animal Anatomy* explore the physical and emotional intersections of humans, animals, and the environment. My personal experiences with animals, as a biologist, bird watcher, and adventure traveler form the backbone of this collection. Themes of feminism, conservation, evolution, extinction, and activism give the pieces muscle, while ligaments of exploration, contemplation, grief, wonder, and celebration bind sections together. Political sociologist, Roman Krznaric, writes, "It is time to recognize that empathy is not only an ethical guide to how we should lead our lives and treat other people, but is also an essential strategic guide to how we can bring about the social action required to confront global warming." Studies show that reading literature can heighten emotional intelligence and compassion. Thus, I strive always for the blood-pumping heart of my writing to encompass empathy and hope. By entering through the heart, I enfold my reader in scientific research to not only inform, but to empower them to create their own dialogue with the natural world.

John McPhee shares his fascination and love for the people and ecology of New Jersey's Pine Barrens to pass those feelings to his readers with the purpose of ultimately preserving the ecosystem and way of life in his book *The Pine Barrens*. In the final chapter, McPhee hammers home his message of conservation saying "people may one day look back…and be able to say at what moment all remaining undeveloped land should have been considered no longer a potential asset to individuals but an asset of society at large—perhaps a social necessity" (156). He leaves the reader in a state of melancholy over the fate of the Pines. He does not give solutions for what the reader specifically can do. Instead, he simply

states, “They seem to be headed slowly toward extinction” (156). By emphasizing the slow death of the Pines and the Piney way of life, he makes this fate seem inevitable. The book feels more like a eulogy, or a collection of history and culture about to be obliterated by the steady march of “progress,” rather than a call to action.

I find this strategy of environmental writing outdated and ineffective. Readers are left feeling hopeless and powerless, which may reflect the author’s own state of mind about the situation. In its early stages, environmental writing aimed to raise awareness about conservation issues for readers. Now, pollution, mass extinction, deforestation, and global climate change are considered common knowledge. People know of the problems, but often feel the issue is too large for one individual to do anything about. They feel helpless and hopeless when faced with the drooling maw of our own destruction. In the final chapter of *The Sixth Extinction*, Elizabeth Kolbert specifically states that she will not end the book on a hopeful message because we are past the point of reversal for mass extinctions and ocean acidification.

For my own environmental writing, I want to uplift, inspire, and empower my readers. This can be as simple as giving them an avenue to aid conservation efforts, or letting them know the progress being made by conservationists, scientists, and environmental educators, such as in my essays “Broken Ocean” and “Community Based Conservation, Environmental Education, and a Search for Scarlet Macaws.” To make real change requires the combined efforts of many, and I aim to bring my readers into that fold, even if only by challenging their ideas on an issue, such as mosquito eradication, or persuading them to care a little more about certain species, such as salamanders. We carry the words of others with us long after we close the covers of a book. Perhaps I am more of an optimist than John McPhee

and Elizabeth Kolbert, but I seek to fill my readers with a spark of hope rather than a dim bulb of resignation or simmering resentment.

Our Animal Anatomy consists of a complete collection of poetry interspersed with sections of creative nonfiction. Following the overarching themes, the poetry sections are titled with Latin names for anatomical terminology, and the prose sections are named after ecological terms for when two ecosystems, or geographic ranges, intermingle and overlap. Poetry compresses an emotion, concept, or moment into a single tangible nugget, while forming neural pathways between disparate or abstract ideas. Yet for some topics, I turn to creative nonfiction to cast a larger neural net to ensnare science, natural history, philosophical musings, and personal experiences. During the writing process, several poems expanded into essays, as with "Pantoum for Vultures" and "The Myth of Cleanliness," and sections of essays took on their own lives as poems, "Pandora's Honeybees" and "Honey Desire," for example. Just as this collection explores how humans and animals overlap, the writing itself overlaps the two genres. Some poems, such as "Spotted Hyena Warrior Women," include a short epigraph to provide scientific context, while my prose falls into the literary tradition of the lyric essay.

I admire how authors, such as David George Haskell, Allison Hawthorne Deming, and Julian Hoffman, blend science and natural history into essays with the word precision of a poet in a way that teaches without being a lecture or sermon. The challenge and joy of this type of writing is finding the right balance of information to include and presenting complex scientific concepts in an easily digestible way for a general audience. Sometimes I distill hours of research into a single paragraph or am forced to trim out fascinating facts for

narrative flow. Poetic influences include Ada Limón, Mary Oliver, and Ted Kooser, for their honed look at life and the creatures that inhabit it.

Psychological studies show that interleaving information by switching between an array of subjects results in better long-term comprehension than studying each subject in turn. This challenges the reader's brain to make connections between disparate information and results in more active learning and engagement with the material. This is why a braided essay works so well, and why I utilize the form multiple times in the collection. Additionally, the organization of my poems creates circular echoes of subject matter, not only within the poetry sections, but throughout the entire book. I hope *Our Animal Anatomy* engages the reader to think of animals and the environment beyond metaphor for humanity, and to consider with empathy humans as animals in nature.

SECTION I:

LIMINAL ZONE

Creative Nonfiction

Manatees and Mermaids

Manatees somehow inspired the legends of mermaids. The placid, bulbous, grey skinned creatures with thick bristly lips and small dimpled eyes look nothing like alluring maidens with fish tails. Scientifically, manatees are classified in the order named Sirenia, after the sirens of myth. Perhaps manatees seemed more elegant to scurvy-stricken sailors who went months without seeing a real woman. Before snorkeling with a pair off the coast of Belize, to me, manatees far more resembled their nickname of sea cow.

Like a cow, manatees spend their days grazing on sea grass, algae, water hyacinth, and mangrove leaves. Docile, slow moving, and having no natural predators, they appear to lack a capacity for fear. Indigenous Caribbean people hunted manatees by luring one close to a dugout canoe with food and then clubbing it on the head. Mermaids in many cultures are said to have done the exact same thing to humans, attracting sailors with song and then devouring the men.

Now an endangered species due to habitat loss and motorboat strikes, manatees are illegal to hunt. In West Africa, serene sea cows are considered sacred and killing one taboo. According to folklore, a manatee is not an animal, but a voluptuous woman named Mami Water who bestows wealth and fortune to faithful lovers, and drowns those who cross her. Modern science shows that this slow-moving sea creature's closest kin are actually elephants, and the rabbit-sized, rodent-like rock hyrax. But perhaps manatees are more human than they seem.

Manatees manipulate their front flippers like hands to hold food. Manatee babies can clutch a mother's flat paddle tail with small flippers to keep up as she swims. Calves snuggle into the arms of their mothers, suckling from nipples on the female's chest.

After a day in cerulean waves off the coast of Belize, snorkeling next to sea turtles, tickling the sandpaper skin of a nurse shark, and hearing turquoise parrot fish crunch corals, I scanned the waves for sea cows. Somehow, the tour captain spotted the wedge-shaped, grey heads of manatees surfacing for air. I donned my gear and slid into saltwater.

Crisscrosses of scars from motorboats stretched across the wide grey backs of two manatees napping on the sandy sea bottom. They did not seem to mind the intrusion of fin-footed humans into their watery world. The male moved to gently kiss and caress the female's back and sides. He slowly slid his flippers along her scars, tickling her sensitive vibrissae, thick hairs connected to a network of nerve endings she uses to feel her way through a murky underwater existence. After a few minutes of foreplay, she flipped to face him and the pair swam to the surface. Hugging each other close, they mated belly to belly. Slowly rotating under the waves, he supported her as she lifted her nose to gasp a breath. She held him as he inhaled.

Perhaps this is the manatee the sailors saw, this tender lovemaking. Perhaps this is the mermaid they hoped would rise from the depths for a kiss. Perhaps manatees are more human than I believed.

Dumpster Diver

A chill October breeze tumbles autumn leaves across my path as I walk home from the bus stop at night. A skittering echoes from the apartment complex dumpster, and I pause under the yellow glow of a streetlight. A crinkling of chip bags. The muted *tunk* of flipped cardboard.

Hopeful, curious, cautious, I lean forward to peer into the dumpster's depths. My breathing becomes shallow to minimize the sour inhalation of rot. Movement tickles the shadowed recesses of the bin.

Two sets of dark eyes glitter from black masks. We regard one another. I am not sure who is intruding upon whose space.

Both critters climb out of the bin and onto the plastic, corrugated lid. The smaller one walks along the far edge in haste, jumps down, and its ringed tail disappears between parked cars. The larger one arches its back and prickles slate-colored fur like a cat. It keeps a petite triangular face, much like a fox's, fixed on me.

I hold still and call out, "Hello cutie pie!" in the higher pitched stretched syllable speech I reserve for puppies and babies. "It's okaaaay," I say, hoping that my delight at our encounter can somehow radiate from me to my fellow urban denizen. That somehow we can communicate through the shared magnetic waves of mammalness.

The crepuscular creature keeps its eyes on me and its furry body tensed and ready to flee. Am I dangerous? It takes a few measured steps closer to sniff a bundled grocery bag resting on the dumpster lid.

We keep our gazes glued, but I occasionally break eye contact to look around the nighttime neighborhood in case the beastie interprets staring as a threat. I have watched "Call

of the Wild Man" on Nat Geo. I know how quickly a raccoon can transform into ragged snarls and teeth. I know about rabies risks.

Its rounded soft grey ears flick to catch sound like a dog. Its face looks sleek and small compared to the hunched bulk of its body. Its eyes stay on me, but take on a glazed look as the critter's main attention focuses on touch. Its dainty black paws feel the contents of the discarded grocery bag. The scavenger plucks out a piece of popcorn, transfers the catch to its mouth with one small hand, and crunches the morsel down in a few bites. Searching by touch continues and it consumes several more kernels.

I know that feeling of seeing by touch. Of reaching into the body of my frame backpack, hands probing for the particular texture of the shirt I seek. I am well versed in the hand to mouth motion of popcorn munching.

After some thorough olfactory examination, the bag is discarded once again as the dumpster diver descends into the treasure trove of the bin. Small paws crinkle plastic bags, and I step closer to peer inside. I do not want the little gleaner to feel trapped. I imagine a snarling mass leaping out of the trash right at my face, but I have to squint to see the shadow within the shadows sorting through people's refuse.

I had friends in college who hopped into dumpsters behind Panera Bread to pick up bags of perfectly good day-old bagels and loaves. We feasted on multigrain and cinnamon swirl until it grew moldy or stale and then we deposited it in our own dumpsters. I wonder if other animals, crows or rats perhaps, made of meal of what we refused to eat, like some sort of modified food chain. The wheat sprayed with pesticides to keep insects from eating it is ground into flour, baked into bread, put on display for people with money, then thrown out and recovered by people without money, then those leftovers are tossed again, eaten by

scavengers again, and finally deposited as digested waste to fertilize manicured lawns or squandered on concrete.

Of course, the contents of well-sealed trashcans may end up in a landfill, buried and oxygenless, nutrients trapped for hundreds of years. Or, like in my small city, the garbage may go to an incinerator, which burns assorted paper, plastic, metals, etc. to create energy and exude toxic ash that either flies into the atmosphere or is sent to a landfill anyway.

Regardless of its ultimate fate, for this raccoon, some rubbish seems more delectable than others. The critter flips over a hollow egg carton, its hand comes out empty from a box of Choco Pies. Something in the back of the bin seems profitable. Styrofoam slathered in sauce? A rice cracker? Crunch, crunch, gone.

I remember reading about how skunks picking around the edges of landfills or raiding people's garbage cans sometimes get their heads stuck in Yoplait yogurt cups. Their wedge shaped craniums can fit into the tapered cups to lick out leftover strawberry banana or harvest peach, but the lip around the small opening prevents the skunks from pulling their heads back out. Trapped, the animals often suffocate or die of dehydration. General Mills has been aware of this problem since a lawsuit in 1998, but rather than risking brand recognition, the corporate giant now marks Yoplait yogurt cups with a miniscule message "Protect Wildlife Crush Cup Before Disposal." Many people do not see the warning. Many animals still die.

The diner licks something unsavory, hot sauce perhaps, shakes its triangular head, scrapes a pink tongue against the roof of its mouth and squints. The black corners of its jaw seem to turn down in a grimace.

As human settlement sprawls into once wildlands, adaptable animals learn to cope with their concrete covered homes. Bears who dine out of trashcans often live shorter, fatter lives. A single trip to a dumpster provides more calories than twenty hours of foraging for nuts, berries, and carrion in the woods. Able to bulk up quickly, female urban bears can have cubs three years younger than their wild kin. Yet this new habitat comes with its own risks, such as car collisions or the guns of wildlife management because not enough large secluded tracks of forest remain for safe relocation. More and more urban sprawl overlaps the wild with us.

When it becomes clear my fellow mammal is about to leave, I pull out my phone with slow movements. As the flash repeatedly brightens the dumpster, I feel like a paparazzi – the unexpected wildlife sighting like seeing a celebrity in my local coffee shop. The diver resurfaces, stretching its front paws to grip the edge of the dumpster's open lid. Then in a fluid leap I am presented with a ringed tail. It walks to the far corner, turns to give me one last look. I lower my screen to resume my connection with bright eyes in a black mask before the creature slips into the night.

After our encounter, I feel slightly less guilty about putting potato peelings and carrot stubs in the trash. I grew up composting, but living without a yard makes that act a bit more difficult. I hope some dumpster diver can make a meal of my scraps. I can only imagine the sharp toothed delight when I toss trimmings of chicken fat into my apartment complex dumpster. I like to think that my negative impact is at least a little less negative for someone.

SECTION 2:

OSSA

Poetry

Amphibian Bones

Red-back salamander
with gold-ringed eyes,
fresh hatched hands
clinging to the pad of my smallest finger,
you have bones like me.

I once sliced off an axolotl's hand
to study limb regeneration,
watched stem cells calcify,
or become slow skin.

I saved the severed tissues,
stained them transparent
with Wint-O-Green dye,
the bones turned bright blue.

Five sapphire fingers now wave
from a vial where I keep
that splayed, stained glass hand
like the hands I have, and yours
touching my skin like dew.

At the Shuttle Stop after a Red-eye Flight

I sit in the winter morning sun
warmed corner, yellow-white beam
slanted through the glass,

let my gaze linger over bronze
geese sculpted in flight,
their still swoop like a living

crest-trough ocean wave,
a stretched note, a jumped rope,
a string reverberation.

A janitor, clad in neon, pauses
a garbage cart in the beam,
a smile splits his shaggy face.

Deaf, he moves his thoughts to me
with the control of a dancer,
eyes and fingers choreographed

to show a shiver melting in the sun.
Without the reverb of sound
we acknowledge our shared experience

of crest-trough wave of photons.
This communication of light—
sun-warm on a winter morning.

Sandhill Cranes
~Platte River, Nebraska – March

Here I am
Here I am

call the cranes
as they imprint
a migratory melody
across the sunset scroll
of a player piano sky

I won't lose you
I won't lose you

in the multitudes,
a singular crane
dots discord
across the script
calling with no answer

Here I am

burnished copper
glints off grey
feathers
in the twilight

Here I am

We Take the Hawk to the Self-Service Carwash and Pet Spa

Mud gunks his wings
and tail into a lump,
the added weight of gravity
too much for hollow bones.

We want more fight
as we clasp his fisted feet,
pin his wings.

Warm spray
reveals the striped feathers
of a juvenile.

Only one foot stutters open
and we fear
rat poison.

I look into the hawk's yellow eyes
ringed with muck
like poorly applied mascara,

and think of his three days
grounded in a deluge
exposed in a farmer's field
unable to flee
what teeth may come,

think
how fear can break
into resignation.

Now cleaned and fluffed,
given water and two mice,
held against my chest
a little more kick
a little more slice
in those yellow eyes
tilted back at me.

Gone

The thylacine:
slender striped body
only alive now as skin,
somehow doglike, somehow not.
A pocket on its belly for babies.
Impossible elongated jaw
so full of sharp teeth.
Like an urban legend,
it moves only in
grainy film clip.

Did the heavy-set ground pigeon
actually survive outside
its current museum case?
Did the dodo ruffle dust
off grey-black feathers,
thud the earth with thick reptilian feet,
find love, nestle chicks,
live a life beyond
the pages of Wonderland?

Two horns growing from
a rhinoceros face.
Eyelashed dewdrops of black
in a creased desert of thick grey skin
bristled with tiny hairs,
somehow hoglike, but very much not.
Between cracked pavement
and grain fields,
our children will ask
where could an animal the weight of a tank
ever have roamed?

Contemplations at Children's Peace Monument
~Hiroshima, Japan

cellophane folded
delicately with a pin
holds a precise wish

but

paper cranes can't
undo the lasting effects
of an atom bomb

yet

school children still
crease a thousand paper wings
symbolizing hope

but

animosity
seems incurably part of
our human nature

yet

if a lone atom
can shake the world, then why not
origami birds

Broken

~Gili Meno, Indonesia

Coral bones are like my bones.
Calcified curves anchor the shape of soft tissues:

scarlet organ pipe coral
large brain root coral
devil's hand leather coral

Porous yet sturdy.
Strong until they shatter.
Bombs broke the bone beach I walk upon.

Dynamite blasted reefs
one stick = hundreds of dead fish bodies bobbing
or sunk
to bed.

Gulls screeched
men hauled basketfuls of wide eyes
tropical scales tipped. An endless sea-feast.

Until the flesh
fell
off
dead bones.

Until the sweet meat could not breed.
No curves to hold together

the ocean floor

a rubble.

Cervid in Four Seasons

Winter

I go lean,
move my emptying stomach southwards,
follow my brothers & sisters
of the green.
I strip trees
for a thin bark taste
to ease the gnaw of winter.
I drink snow that hides
life underneath,
sustain on the prick
of pine needles,
if I must.

Spring

I grow
round with baby.
Heavy belly tugging gravity
to my leap.
Or I grow
tall with velvet
antlers hardening bone from blood.
I navigate the new weight
of my crown,
pluck tight buds from twigs,
browse new shoots.

Summer

I follow
Mother,
pull hot milk
made of ivy & blackberry,
dogwood & honeysuckle.
Unspotted in underbrush,
I listen
to the territoriality of birds,
the adorations of insects,
the imprint of cloven hooves
upon moss and mushroom scented loam.

Autumn

I rut
the two step of posturing,
the brash clash,
the push & push & push
of feet sliding furrows in the mud.
Or I watch
while folding golden leaves on my tongue.
I lift my tail for the rush of the victor.
Crunch the fallen
apples & pears,
acorn & chestnuts
to ready my coat of fat.

Fruit Bats

slap moonlight with wing skin,
hook claws in drooping flowers
lick nectar with pink tongues,
faces dusted in yellow pollen

petals drop, fruit grows swollen
for bats to sink incisors, sup juices,
spread seeds in guano
durian, mango, banana, guava

forest building fluttered wings
caught in rough netting,
pummeled with clubs
and sold to market as meat,

while the trees weep fruit

Asphyxiation

sweaters tight
around the neck

thoughts of a lover's hands
compressing my windpipe

blistered pricks of fire
in underwater lungs

at birth my umbilical cord
a noose

lips blue
before the scream

A Conversation in Coasts

You think I am a peach colored beach
full people sizzling their skin
to the sound of children destroying castles.

But I am the salt crusted sting
of mystery wedged in the crevices
of waiting tide pools.

I am the clatter-chatter
of smooth stones and the desperate
reach of white fizz fingers.

I am the blue-toed chill
of ex-ice floes pricking pain alive
in the liminal zone of you and me.

Honey Desire

Fireweed honey:
reddish tint
a deeper, warmer flavor
than wildflower.

Apple blossom honey:
nearly clear gold
with ephemeral sugar
so mild I question
my tongue's imagination.

Clover honey:
standard glistening
mixture of floral undertones,
soft like a kitten's paw.

Killer bee honey:
almost brown
it looks burnt,
sweetness tinged
with a slight smoky taste.

Not the sharp acrid
I expected
to reflect the bees'
deadly reputation.
The only difference,
in essence,
is how much they
desired to keep it.

Their honey held
the same kiss
from a flower's mouth,
the same language
of dance,
the same saddle bags
of pollen on black legs,
and the same hexagons housing
so many sisters.

SECTION 3:

ANTHROMES

Creative Nonfiction

Flirting With Emu

I slip into the emu enclosure with a long handled scooper bucket and rake. Three emu make grunting sounds with their air sacs as they mosey past me, a deep sound like drums. Their brittle feathers rustle like dry grasses. Large dinosaurian feet leave triple toed footprints in the mud.

I start working in the grassy yard, seeking out green patties of emu droppings and raking them into my bucket. Keys jangle at my belt as I pivot from one scat pile to the next. I work quickly, not just because as a zookeeper at a small zoo I have a long list of tasks to complete before we put the animals away for the night, but because of—

"Buabua bump, buabua bump."

I feel a gentle rubbing on my shoulder like a lover's caress.

"Hello, Walter," I say with a sigh, turning to meet my admirer.

"Buabua bump, buabua bump," he drums in reply – the emu equivalent of "Hey, baby."

"You know, Walter," I say looking into his large orange eyes, "It's never going to work between us. The whole different species thing."

Walter does not seem to mind. He softly strokes my shoulder again with the lower portion of his long neck. His feathers sound like autumn leaves blown in the wind.

Hastily, I turn and stride away to the next pile of emu poo. Walter grunts and follows. His hips dip and his head sways like a man walking with his hands in his pockets and his eyes on a woman. When he approaches I turn to keep him always in front of me, or to the side, never behind.

From the walkway above I hear, “Look Aiden! She’s got a friend.” I look up and smile at the mother pushing a stroller while her four year old boy tries to stick his head through the bars to get a better look at the emu and me.

“Yes,” I call back. “Walter is very friendly. He likes to keep me company.” In truth, Walter is a very lonely emu. While three other members of his species share the enclosure, Sheila and Matilda prefer the companionship of Boomer, a larger, younger male. When Walter comes near, the two girls stretch their necks to reach a full six feet in height and hiss. Sometimes they chase him around the field or snap with their blunt, black beaks.

I could understand his exasperation. Two years ago, I broke up with a long term boyfriend after it became obvious our life paths were diverging. Since then I had only been on a couple of dates, leading nowhere.

Of course, I was not putting as much effort into finding a relationship as Walter. He flirted with all the zookeepers who entered the emu enclosure. However, Tom and I seemed to be his favorites. Perhaps something in our two legged strides reminded him of a buxom emu babe. Or perhaps because Tom and I rarely assisted with Walter’s medical procedure to disinfect his intimate appendage after his sexual frustrations led him to mate with the ground.

A brain the size of a walnut controls the world’s second largest flightless bird. Personally, I am looking for a partner who can carry on an intellectual conversation. I have seen an emu repeatedly try to eat the green logo off a white plastic shavings bag.

Still, I could do worse than finding a boyfriend with the characteristics of an emu. The soft feathered, brown birds make excellent fathers. Females mate with multiple males and deposit large dark green eggs in the nests of several of her chosen consorts. From then on, he takes full responsibility for child rearing.

Emu give the term stay-at-home dads a new level of definition. Males forgo food during the eight month incubation period and drink only dew gleaned from any grasses they can reach without leaving their eggs. With careful attention, daddy emu nudge their beaks under the oblong eggs keeping them in a systematic rotation. When chicks hatch, males defend their young with powerful kicks and teach them how to find food. At night, the cream and brown striped hatchlings nestle under the shush of his feathers.

I scrape another wet pile of emu manure into my blue bucket, and hit the rake on the side with a *thunk*. Walter keeps an amber eye cocked in my direction as he pecks at the ground beside me.

I sigh. We are not so different in age. I came screaming into the world exactly one day before Walter popped from his egg. Both in our mid-twenties. Both looking for love.

I stare at the way the short black feathers curl on the top of his small head. Sensing my attention, Walter fluffs his neck feathers and starts to swagger in my direction, emitting coy grunts.

"I'm sorry, Walter," I say, picking up my bucket and marching toward the gate. "It's never going to happen."

Mosquitoes

I wouldn't mind mosquitoes so much if their bites didn't itch. I would say, sure, have a sip of my blood. Fill your abdomen red. I have 1.2 gallons; a drop or two I can spare. She can take my blood to a pond or still water and release that bit of me into the bodies of her babies. Let them be eaten by fish or frogs. Let me swim and chorus in the waters. Or she can take my blood to the sky and be eaten by a bird or a bat. Transform my hemoglobin into feathers, into echoes of the night.

But mosquito bites *do* itch, and I can't help but hate them for it. Of course, the insect does not aim for our discomfort. She (for only female mosquitoes drink blood, males sip nectar or honey dew) would rather go about her business of collecting protein for egg production silent and unseen, or rather unslapped. The irritating red reaction is our own body's defense to her anticoagulant salvia. Her needling proboscis pierces our skin's defenses, breaking our barrier to the pathogens she may carry from one of us to another. Our histamines act as anti-insect incentive for our own good.

Back in our evolutionary chain, people who itched, smacked mosquitoes, rubbed themselves with pungent leaves, created oils to deter bloodsuckers. One mosquito might not do much damage, but a cloud of thousands? Those who itch avoid mosquitoes and the blood borne pathogens they can carry. Malaria, dengue fever, zika virus. Mosquitoes don't want their source of easy meals to die, they just become unwitting vectors flitting from infected to uninfected.

We share our planet with approximately 3,500 different species of mosquitoes, but not all pose equal risk to people. Only *Anopheles* can carry the malaria causing parasite, and most live in Sub-Saharan Africa, South Asia, or South America. The parasite slides in with

mosquito spit and takes up residence in its new human host, a much better home than a short-lived insect. Once infected, a person possesses malaria forever, and can suffer from reoccurring outbreaks of fever.

Scary little side note: While several antimalarial drugs exist, the US government often issued mefloquine to troops deployed in at-risk areas overseas. Ten percent of users report severe psychological side effects, such as insomnia, vivid dreams, mental clouding, anxiety, coordination problems, paranoid delusions, and psychosis. In severe cases, it causes brain steam lesions and leaves lasting side effects similar to PTSD. It sounds like a terrible idea to give people with guns drugs that can cause psychosis. Thankfully, the US Department of Defense has almost eliminated its mefloquine use by 2015, and now only prescribes it to people who cannot tolerate other antimalarial medication.

However, humans only rank number two as deadliest creatures on the planet (to humans, anyways). Public enemy number one on world health organization lists is our good old friend the *Aedes* mosquito. Labeled the deadliest animal on the planet, mosquitoes, or really the maladies they transmit, kill approximately one million people a year. *Aedes aegypti* and *Aedes albopictus* can transmit dengue fever, yellow fever, West Nile virus, chikungunya, eastern equine encephalitis, and Zika, in addition to many other, less notable diseases. A friend once described dengue as feeling like someone shattered all his bones and then lit them on fire. No thank you. I would rather stink of DEET, even if it is a known carcinogen.

To an outside observer, such as the alien in the Disney movie *Lilo and Stitch*, mosquitoes may appear as top of the food chain, and as if in ceremonious offering, we create the perfect habitat for them around our dwelling places. Mosquitoes lay their eggs in pools of

water, such as flower pot trays, discarded containers, collected water on tarps, or any other place where an inch of standing water can gather. Unlike the ponds or puddles where they oviposit in natural environments, few larvae predators, such as fish, inhabit places like the inner rings of old tires. Without this natural form of control, mosquito populations proliferate worldwide. In this way, as the human population increases, so does our scourge, the little bloodsucker.

To combat the artificially inflated mosquito menace, we turn to technology. After four reported cases of Zika in South Carolina, the local mosquito control district of Summerville conducted aerial sprays of pesticides in an effort to reduce mosquito populations and assuage residents' fears. The blanket of biocide inadvertently killed millions of honeybees, devastating local beekeepers, and who knows how many other beneficial bugs. Even more alarmingly, a 2014 study found that pregnant women who lived within a mile of agricultural areas treated with pesticides containing many of the same chemicals as the mosquito killer sprays, had a 60% increased chance of giving birth to a child with autism spectrum disorders.

Other areas try to control mosquitoes by putting chemicals directly into water supplies to disrupt larval development. However, picking up trash and just pouring out containers of standing water would greatly help to reduce breeding areas and thus population.

Oxitec, a British biotech company, cooked up GMO male mosquitoes to thwart the species' spread. These modified males mate with wild *Aedes aegypti* ladies and transfer a gene that is fatal to offspring. Theoretically, the mosquito population should slowly reduce over time without the harmful side effects of pesticides on the environment. Florida, and several South American countries are already testing these genetically modified insects in the

field. However, some people fear, that like in Jurassic Park, life might find a way and our carefully tinkered DNA manipulations may have unintended consequences. After all, many species, including bats, frogs, and fish, rely on the winged annoyances for food. If we eliminate mosquitoes we may eliminate them too, and not even science knows how many resultant dominos may fall.

Part of me would rather regard the mosquito from an ecological point of view: they help control the human overpopulation problem and provide sustenance for many other species on this planet. I am not zen enough to say live and let live if I catch a little bloodsucker on my arm. The itchy part of me would rather the winged annoyances just leave me alone.

The Killer in Me

One day when I was probably about seven, my Dad and I were driving the old baby blue Ford pick-up to the dump. Spotted with rust, algae growing in the corners of the windows, a perpetual musty smell on the inside, and a symphony of rattles emanating from every corner – "a real farm truck," as my mom said. I don't think we were talking. I don't think the radio was on. If it was it might have been playing Radio Disney for me, or the news or a baseball game for my dad. As the truck started to warm up and rumble along I noticed tiny pink baby mice crawling out of a hole in the vinyl floor near the gear shift. Bulging black eyes sealed by thin skin, wrinkled newborn bodies, spaghetti tails, limbs in stuttering movement. They looked just like the tiny furless creatures our pet Russian dwarf hamsters had birthed. I had taken the hamster cage to school for show and tell. All the kids gathered around eager for a glimpse of the babies hoping the mother would rearrange the woodchips around them, or better yet, pick one up in her mouth and carry it across the cage. On the floor of the old truck I saw no mother mouse.

I watched the helpless babies crawl and tumble around the truck floor. One slid into the driver's side where my dad's size thirteen feet worked the pedals. As we coasted down a hill, my father lifted his foot and brought it down hard on one of the baby mice. My dad, this tall quiet man with gentle hazel eyes, bald and with a mustache, quick with a smile and a silly dad joke, hardly even looked down as he deliberately smashed one baby mouse after another. Pink pulp. He didn't say anything. I didn't say anything.

I had seen the mouse traps Dad set up in the furnace room. I knew he put rat poison out around the chicken coop, but that was not the same as this. When we arrived at the dump,

my dad scraped the bottom of his boot on the gravel, and we got to work unloading the truck. For the rest of the day, I felt something inside my chest like the rustling of dry leaves.

During a family vacation a year or two later, a commercial fisherman took us to catch trout in Yellowstone Lake. My brother reeled in plenty of big ones and after a photo or two flipped them back in the water. My line grew taunt. I reeled in. A small fish about the length of my forearm thrashed at the end of the line.

"That looks about eating size," said our guide helping to unhook the fish. He slid it flat on a white board with black ruler marks. "Congrats! Just barely legal!"

We slipped my fish in a white bucket. I watched it gasp water for oxygen. Its cheeks a burnished red, its sides glistening silver and speckled with black like the night sky in reverse.

My mother put her hand on my shoulder. "We could put it back," she said. "It's your fish."

I got to decide if we ate it or not. *I* could bring home dinner. *I* caught the only fish of eating size. Although I did not swing the club, *I* was responsible for the squelch of its death.

The hotel cooked my fish and served it as white diced cubes on a bed of lettuce. As a buttery taste with a hint of citrus filled my mouth, I forgot the black orbs of its eyes, the way they stared unblinking at the world.

The year after graduating college, I watched the house and took care of the animals for my parents when they went on vacation. For some reason rats multiplied like crazy that summer and infested the area around our red barn and the chicken coop. The hawks, owls, and stoats could not eat them fast enough, so my dad started putting out rat killer. I kept the bait boxes

filled with the poison yellow cakes, but they seemed to have little impact on the amount of rat droppings we found in the dogs' food bowls and scurrying shadows when we opened the chicken coop. My mom said that when you see one rodent you know there are dozens more you don't see.

I suspect part of the problem was our old mare Suzie. At over thirty, her worn-down teeth could barely chew hay, so she switched to a nearly all grain diet. She liked to hold her head over the stall wall as she munched and bits of her meal rained down to mix with the rough-cut wood chips below. I am sure the rats cleaned up what we missed. It also probably did not help that our barn dog Bonny often left kibble in her bowl to eat later, or that no lid covered the food dispenser in the chicken coop.

I rarely saw a dead rat. The poison we used made them thirsty. When the rats drank water, it reacted with the chemicals in their stomach killing them. Most probably died in the woods.

At the height of the infestation, I came out in the evening to feed the animals and clean the barn. I greeted the four horses, and as I rubbed Suzie's white nose, movement in her hay bin caught my eye. Three brown rats about the size of shoes scurried in circles. Unafraid of the horse, they feared me. I leaned over the stall wall watching as they ran in circles trying to gain enough momentum to jump over the lip of the tall plastic hay bin. Leap, thump, slide back inside the bin. Leap, thump, slide. I felt calm, curious, mesmerized like how I imagine a cat feels while sitting on a window ledge watching.

After several more escape attempts, it occurred to me how I could kill those rats right then. I could grab the pitch fork leaning against the barn wall, raise it above my head, and

stab – one, two, three. Easy. I stood there watching the leaping rats. Suzie pawed her hoof and nodded her head, impatient for food.

My mom hated rats as harbingers of disease. My dad hated how they ate our animals' food. I hated how they left their droppings everywhere and chewed up one of the saddles.

One of the brown velvet-furred rats paused, its sides quivering with quick breath; it blinked bright black eyes, twitched silk whiskers. The rat ran up a clump of hay like a ramp, launched, and slammed into the smooth plastic side mere centimeters from the lip. The other rats ran the hay ramp. Then one, two, three they were up, over, and gone.

I could have killed the rats and flung their bodies from pitch fork tines into the woods. But I didn't. I trap spiders under a glass and put them outside. If an insect lands on me I coax it to fly away or move on to a blade of grass. Biting bugs being the exception. Well, those and the moths I captured and killed at a biological station for identification, pinning thoraxes and splaying powder wings for display one summer.

Perhaps I wanted to know what the rats would do.

Perhaps because until high school I could read and understand animal body language and behavior better than with fellow humans.

Perhaps because I did not feel like disinfecting Suzie's hay bin if any guts or blood spilled from the pierced rodents.

Suzie whickered and pawed the ground for food. After cleaning the barn and feeding the animals, I broke off blocks of yellow rat poison and placed it in the empty black bait boxes. Indirect killing. I did not have to look into my victim's eyes, watch movements falter, light fade. Easier to think of them as poop-leaving-pests than fellow living creatures. Easier to not think of them at all.

At age twenty-five, I killed an animal with a gun for the first time. It was my third field season living in the mountains of Belize while working for The Peregrine Fund to hand-raise and release captive bred Orange-breasted Falcons into the wild. My team also studied and monitored the wild population of this rapidly disappearing species. We visited falcon nests and clamped colored identification bands on the legs of as many chicks as possible. We strived to monitor their movements and survival.

My coworker Matt dangled from a rope slowly lowering himself down a limestone cliff face. From the river below, Jonathan I watched him though a spotting scope and radioed directions. “To your left more. Stop. You are right above the nest.”

“I see it.” Like a pair of black fighter jets, the parent falcons sped in screaming displeasure like gunfire and raking Matt’s helmet with long talons. Matt lowered himself further. With a toehold on the small ledge of the eyrie, Matt radioed, “This doesn’t look good.” The parasitic, flesh-eating larvae of bot flies squirmed under the chicks’ skin, filled their ears and nostrils, and created gaping black crusted wounds on their heads. They panted in the dust, large black eyes nearly swollen shut, white down matted with dried blood. After little debate we chose to usurp the laws of nature and save these two small members of our study species. Matt scooped the baby birds into his backpack and ascended the rope.

With little coaxing, the dehydrated chicks gobbled up ground chicken soaked in Pedialyte. Their voracious appetites gave us hope. It took several hours to pluck out all the larvae, a painful process involving Vaseline and tweezers. The next day we took them to a wildlife veterinary clinic for antibiotics. The recovering falcon chicks then lived in a padded cardboard box in my hotel room. For the first few nights I woke whenever their movements

made scuffled sounds. Every morning I feared the worst until I saw large black eyes blink up at me from fluffy white down heads. After a several days, the chicks spent more time awake, flapped their growing wings, and ripped up crumpled paper balls to play.

As swift aerial predators, Orange-breasted Falcons kill and eat other birds. We needed to feed our growing babies the rich red meat of wild birds. We borrowed a pellet gun and set out to nab some pigeons. More experienced with guns, the other members of my team did most of the hunting while I did most of the skinning, gutting, and feeding. I discovered that pigeons are easiest to skin when still warm in death or thawed from the freezer. With a pocket knife and scissors, I sliced thin grey skin and peeled it back like opening a bag of chips. Inside the pigeons' crops, the throat sacs where birds store food, I found everything from cornflakes to dog food contained in opaque membranes. I carved the wine-red breast, cut muscle from legs and wings, and sliced out the liver and heart. The two chicks, a boy and a girl, gulped down the flesh and organs until their crops bulged, and eyelids drooped in contentment.

After a week or so, my compatriots took the truck to study more nests in Guatemala, leaving coworker Rony and I to hunt for the chicks. We walked a few minutes from our hotel to a neighborhood in the town of San Ignacio where a family invited us to exterminate the pigeons living in the eaves of their roof. The birds cooed early in the morning and shat all over the porch.

After a few missed shots, Rony handed me the pellet gun. "Give it a try." My only experience with firearms outside of videogames included my brother's BB gun when I was a kid, and a shotgun which I fired once the year before. I had hit nothing but a few paper targets, some tree bark, and a basketball.

I hefted the black pellet gun to my shoulder and alined the green piece of plastic at the end of the barrel between the two red dot sights arranged like goalposts, aiming at a dumpy grey pigeon squatting on a nearby roof. Crack! A few feathers puffed into the air as the bird flew away, but the small attic window behind it broke widening an already existing hole in the pane. I quickly handed the pellet gun back to Rony.

After several misses, Rony managed to bring down a single pigeon. He rattled the ammo tin. “One pellet left.” He passed me the gun. “You should take the last shot.”

“I don’t know…”

“I have a good feeling about this.”

“I don’t want to waste the last bullet.”

“You can do it. When I feel like this it always comes true. Like a premonition.”

My chicks were hungry. I aimed carefully just above the breast of a pigeon looking down at us with orange eyes from the edge of the rooftop. I inhaled slowly and held it like how my dad taught me to keep a steady hand for photography. I squeezed my finger. Bam! The pigeon toppled forward, slid down the corrugated roof, and tumbled to the ground. My shot ran clean through its iridescent neck.

“I did it!”

“See, I knew you would,” said Rony as we high-fived. Ammo exhausted, we rushed home to skin our prize.

While washing the blood from beneath my fingernails after feeding the falcon chicks, it occurred to me that maybe I should have felt something other than triumph and joy at my intentional killing of another creature. Sure, the bird died to help to save an endangered species. Sure, the standard city pigeon, or Rock Dove, is an invasive species in the Americas.

Sure, they are considered pests, often called flying rats, reproduce quickly, and live off scraps. But pigeons are also surprisingly intelligent creatures able to learn tasks and recognize patterns. They live in social groups, have swift tapered wings for elegant flight, and white ones symbolize peace. Shouldn't I feel guilty about killing one? I did not, and still do not. Like my hunter gatherer ancestors, this is the killer in me.

Domestication

Rows of wire mesh cages line the walls of a fur farm barn in Siberia, Russia. Wearing a white lab coat and thick gloves, a woman with a clipboard methodically walks down the rows. She unhinges a latch and sticks her hand inside. A young silver fox (*Vulpes vulpes*) cringes from her intrusion, ears flattened, crouched with muscles tensed, black lips curled back in a sharp toothed snarl. The researcher removes her hand, locks the cage, and marks a swift X on her spreadsheet. She moves on to the next one. This fox backs away, but her dusky ears remain forward, alert, her amber eyes fix on the human's grey-blue, waiting, watching, unsure. A slight smile crimps the researcher's lips and her pencil ticks a check mark next to the fox's corresponding number. This *Vulpes vulpes* becomes one of 100 females and 30 males selected as the parent generation for an experiment where foxes are bred for tolerance towards humans or docility, then for tameability, to examine the evolution of domestication.

When we killed all the wolves in Yellowstone, the rivers shifted course. Lacking routine predators, the herbivores grew lax. Elk languished at watering places. Munched all the tender shoots, grazed away the banks holding saplings and scrub. Riversides began eroding, beavers disappearing. The elk became like domestic cattle, spread in loose herds devouring all the edible plants and then plodding on, ravishing the habitat they relied upon, weakening it and themselves.

When we returned the wolves, the rivers moved again because the elk moved again. Lazy elk became easy prey, and instinctual fear, survival instinct, reawakened in the elk

population. With wolves on their heels the elk moved in tight bunches, herds never staying in one spot long enough to raze it. The points of their cloven hooves tilling the soil as they ran.

Willows returned, beavers returned, birds returned, and the elk themselves flourished. From wolf jaws, from mortal dread, came life.

After four generations of rigorous selective breeding, where aggressive foxes became fur coats and docile ones passed on their genes, pups appeared that responded to humans by wagging their fluffy, white-tipped tails. By the sixth generation some pups eagerly sought human contact, wagging, whining, whimpering, and licking hands. After 31 generations the majority of the experimental population registered as “behavioral elite,” so designated by their preference for human companionship and ability to read human social cues, such as gestures and glances, much like dogs. Man’s best friend is born with the ability to read people. Puppies quickly learn to look where a finger points to get a treat, while wolves, and even chimpanzees, struggle with the same task.

Between 20,000 to 10,000 years ago, humans domesticated themselves. With the advent of agriculture, people started living in larger groups, which required more social acuity to avoid conflict.

Renowned wildlife behaviorist Temple Grandin suggests that ranchers should herd their cattle like a wolf stalking prey. Despite generations of selective breeding for large udders or beefy haunches, cows still hold the instinct in their genes to face a potential threat and move away when approached at the shoulder. Rather than using an electric cattle prod and

whipping the animals into a panic, taking advantage of their predator avoidance instincts can get livestock to walk calmly, if warily, into a pen or shoot.

While researchers bred foxes solely based on behavior, the docile generations began to exhibit “morphological aberrations.” First, some domesticated foxes were born with piebald markings especially a white star in the middle of their salt and pepper foreheads as if someone splashed bleach on their silver-black fur. Others appeared with brown mottling similar to the agouti coloring of rabbits or bay horses. In successive generations, researchers started seeing foxes with floppy ears like a Labrador retriever, or curly tails held high over the animal’s back like a husky. Many generations into the experiment, even their bones began to morph giving some foxes stubby legs like a corgi, or a scrunched skull with a snaggle-toothed under bite like an English bulldog. Many domesticated mammal species, from horses, to pigs, to rabbits, to cows also exhibit these same genetic mutations for floppy ears or piebald coats.

Domestication caused human bones to morph, too. Hunter gatherers, or wild-type humans, have longer, narrower jaws to withstand the basic stress of their diet. Agricultural humans chew softer, more processed food leading to wider, smaller jaws. Perhaps like wolf to dog, our skull shape is somehow genetically linked with tame behavior.

At White Oak Pastures, an organic chicken farm in Georgia, thousands of hens strut acres of pastures fallowing in the hoof prints of the farm’s cattle, scratching through cow patties and gobbling up grubs in a system that is more natural for the animals and the environment than

the typical American factory farm. While White Oaks business booms, bald eagles put a dent in their profits. America's national bird gather in flocks of 60 strong in the winter and gorge themselves on the all you can eat open-range poultry buffet.

The shadow of a seven-foot wingspan slides over the bent heads of thousands of brown hens pecking for bugs in an open field. The raptor tilts on the wind, tucks, dives, and talons-first, *slams* into an unwary chicken, the impact instantly snapping the bird's spine before the sharp beak of the predator rips out feathers and scatters them in the breeze. The surrounding chickens do not squawk an alarm, do not even look up. Selectively bred for generations to rapidly mature from chick to meaty, thick-breasted hen, the birds' brains lost all predator avoidance instinct. Released from the cracked corn of barn life, the chickens know no fear.

Young mammals go through a period of sensitive socialization when they explore their environment, learn to socialize, and develop their understanding of "normal." Once puppies open their eyes and start to move around, show dog breeders expose them to all sorts of stimuli, honking cars, the smell of strangers, the tug of a leash, the hot breath of a hairdryer. Wild foxes have a small window of sensitive socialization and grow the neurophysiological substrate of fear within 45 days. The brains of domestic fox pups do not develop a fear response until four months old.

Like domesticated foxes, human babies are born without fear. Through experience and memory people develop a sense of "normal" based on our exposure to the world around us. A larger window of sensitive socialization led to more people tolerant people. Before the

early agricultural era, paleontology reveals that human males suffered skull injuries more often than early farmers, evidence that interspecies violence (human-on-human fights) decreased with our domestication. The same reduction of aggression occurred for dogs and rats in comparison to their wild-type equivalents. Domestication made humans less hostile. The Early agricultural *homosapiens sapiens* began to lose their fear of one another.

On an evolutionary timeframe, domesticated humans and our cohabitating animals have not been around for very long at all. Although, the fox experiment shows that as few as forty generations can cause inheritable changes in both morphology and behavior, perhaps our wildness, our fear is not so far behind us.

A few friends and I cut through a cow pasture in England to see some ceremonial mounds near Stonehenge. The cows munched grass in a loose herd and paid us no heed. Then we crested a small hill and confronted a huge white bull. His nose pink, his skin rippled in thick folds, eyes dark, horns short, but sharp, his stare intense. We halted and stared back. Human and animal assessing threat.

We could not outrun a charging bull, the fence was too far, and horns or no, his hooves and bulk could kill us. I thought, *Don't show fear. Walk with confidence, calm and assertive.* I nodded at the bull, meeting his eyes like I would a stranger on the street. The bull knew humans, and watched as we gave him a wide berth and left his pasture safely behind.

SECTION 4:

JUNCTURAE

Poetry

The Hole in the Ground that's on Fire and the Water We Wear and the River We Eat

the hole in the ground that's on fire
we did that
by collapsing the desert
with a drill
and lighting a match
we did that
as we turned
the world's fourth largest
inland sea
to cotton
making a fishing town
unlivable
for everything larger
than brine shrimp
except for us
and our landlocked
ships rusting
we did that
just as we keep
the Colorado
from reaching
the ocean
by eating it
trapped
in the green cells
of lettuce
every winter
we do that
the river we eat
and the water we wear
while staring
at the shifting flames
too mesmerized
to move

We the Canary

coal dust darkens citrus feathers
melody of love-longing ceases
and they blame the bird
prescribe it anti-depressants,
but no amount of Prozac will make
a song slip through throat swollen
with FDA approved
sprays, gasses, pesticides
DNA unwound and re-knotted
to survive showers of weed-killer
and we eat it, we eat it all
small particles
stored in subcutaneous cells
cushioning pancreas, liver, heart
bowels, breasts
and as the cells inside us
multiply to seething masses
the corporate foreman
sits on his assets, counting
on we the canary to preen
ignorance from coal dust,
keep heads down in the dark,
and sit
silent as an empty pill bottle

How to Survive Wildlife Rehab

Do not give
an injured animal
a name.

Even if it drinks
an eyedropper of water,
or burrows into
the warm cloth
of your arms,
or if the glow of its eyes
brightens after snatching
half a mouse
from your forceps.

A word
cannot pin it
to life.

The wild ones'
whiskers, and clack, and slither

always
the let go.

Lessons in Hatred

The crows' commute moves opposite mine.
As the mountains blush and clouds turn orange,
I lean over my steering wheel and look up.
Hundreds of black wings cruise and dip overhead,
navigating by freeway for daily migration
as they once used rivers and streams.

I hump along in a metallic herd,
the radio full of family stories
ripped apart at border crossings, deported.
Some cars weave in and out like sharks darting
to razor away seconds.

In a facial recognition study, researchers wore masks
like Halloween hooligans
when trapping crows, tangled wings in mist netting,
gloved hands immobilizing glossy bodies,
identification bands snapped on tarsi,
the anger in obsidian eyes, the grating fear
released back into the trees.

Honking snaps a blonde's attention from texting,
she points a blood varnished finger to the sky.
On my left, a blue sedan tailgates as if to kiss bumpers;
I remember my brother's unsavory joke:
how after women, Asians are the worst drivers,
but worst of all are Asian women.

Years later the researchers returned,
Jason and Freddy Krueger over their faces.
The crows remembered,
welcoming with alarm cries, slashes of talons,
clacks of onyx beaks.
Fledglings retreated to higher branches,
watching, listening, learning.

Hatred spreads like an oil spill,
staining feathers, filling engines.
A siren cries and I think of police shootings.
My radio reports on bombings in Gaza.
Generations later, the original banded birds have died,
but that population of crows
still attacks the masks.

While Looking into the Mirror

Remember that time in college when the feminist
asked you to wear a sticker proclaiming
a favorite part of *your* body.
You had only thought in negative terms before.
In brown marker you embraced wild hair
you used to want straight,
and the large feet
that take you places.

My body is not my enemy.

There is a kink for everything.

I will not feel guilty about what I eat.

Remember that time in grade school
when you saw the Indian woman in the grocery store.
The hair on her arms
strong as midnight
against shea butter skin.
Yet she and her boyfriend flirted handsy
at the end of the cereal aisle. Despite what your mother told you,
you stared.

Milk Snake

Accused of theft in the dairy
by the poor farmer's testimony,
you assert the contrary:
devouring the rat
and not the milk fat.
Yet the dictionary makes you master
of the crime.

Accused of stolen identity,
of which, you admit, you're guilty,
a very calculated mimicry:
your red meets black
venom lack.
Yet a machete sings faster
than a rhyme.

Aberrant Branch

meant to nourish only
sugar-ripe fruits
peaked at the tip
like miniature human hearts,
the root stock
grew its own limb
of bitter black cherries,
like fists clutching stones,
like fists tight in defiance,
a flavor too tart
to rest the tongue,
too sour for sugarcoating

Spotted Hyena Warrior Women

> *Hyenas live in matriarchal societies much like the Amazon warriors of myth. Female spotted hyenas possess pseudo penises, which they use for social interactions. This appendage complicates labor and causes a 10 percent mortality rate for first time mothers.*

Right breast removed with a hot blade
for power and accuracy with a bow.
Mud-splattered war paint.
A laugh that shivers
and crunches marrow.

Veiled in battle gore,
she chooses a groom.
He crawls prostrate. He eats last.
She folds her phallus and lets him enter.

When the feminine fuses shut,
giving birth kills more than war.
She must rip her clitoris to survive.
Even then, womb-wet sister snaps
sister spine to claim the single teat.

The Queen’s crown is jawbone and blood.

Paper Doll

Cut out the figure.
Cut out the clothes.
Fold the tabs over the shoulders,
crimp them around the waist.
Swap, mix-match
who she is
by how she looks.
Her body is yours
to play with.

Picture her silhouette
on the sidewalk
left long where silver blades
snipped her.

You can duplicate her shape
by tracing the edges
of her emergence.
Millions of paper dolls
crumpled in the streets
and sheets.

Reciprocal Altruism

> *Vampire bats need to eat 50-100 % of their body weight in blood each night, and will starve to death after 60 bloodless hours. Full bats sometimes regurgitate part of their own blood meal to feed bats in critical need. Unrelated bats often form a partnership to keep one another alive.*

We part and I find
the tenderness of others
exposed in the dark.
I kiss open wounds
as they sleep.
Lick sweet scarlet
heart pumped,
drop by drop,
into my eager mouth.
Heavy bellied,
I leave them to dream,
oblivious of a moment
tender shared.

You are empty
as sky blushes light,
but you find me
heavy bellied.
Solicit a kiss,
and I remember
mornings where you
held me. Heart pumped,
my night's sweet nectar
flows scarlet,
drop by drop,
into your eager mouth.
I wrap you in
my membranes
as we dream
of a moment
tender shared.

Pantoum for Vultures

A vortex of vultures inscribes a garbage dump.
Corroding bone and bacteria in gastric acid,
austere avians undertake corpses.
Putrid feasters, purifying the dead.

Corroding bone and bacteria in gastric acid,
yet with toxic metal or chemicals, humans manage to poison vultures.
Putrid feasters, purifying the dead
dark feathers spread shrouds around carcasses shot with lead.

With toxic metal or chemicals, humans manage to poison vultures.
Ivory poachers rip cyclones from the sky to disguise their crime.
Dark feathers spread shrouds around carcasses shot with lead.
Collateral damage: winged wakes bleed internal, slumber eternal.

Ivory poachers rip cyclones from the sky to disguise their crime.
Mutts glean from garbage dumps and foam at the mouth –
collateral damage. Winged wakes bleed internal, slumber eternal
death collects the eaters of the dead.

Mutts glean and foam at the mouth,
a vortex of vultures no longer inscribes a garbage dump.
Death collects the eaters of the dead,
austere avians undertaken.

Do not dress me in synthetics

or fill
my drained
veins
with the stench
of embalming fluid

do not trap me
in a lacquered
coffin
sunk
in cement

let me
unravel
into earth

for worms
to excavate
my
inner chambers

for the red
carapaces of carrion
beetles
to carve
my flesh

let weeds
spread
roots through vesicles

suck me
as sugar
back into sunshine

let seeds
separate
carry
me

away

To Survive, We Became Cacti

packed into rail cars
shipped with no fresh water
separated from our soil

roots shriveled and broke
father could not keep
mother sent to gas

our scalps grew prickled
the day blazed with gun barrels
we could only breathe at night

awaking each dawn knowing
the answer to any question
could be fire

we scraped existence
our kept lives locked
in ordered ledgers

when they opened the deserted gates
do you have any idea what it's like
to see running water?

SECTION 5:

BRACK WATER

Creative Nonfiction

Pandora's Honeybees

After a steep hike through the Belizean rainforest with my coworkers, I sit on the rim of a huge sinkhole to catch my breath. Through a spotting scope, I locate a female orange-breasted falcon perched on a vine. Her crop bulges from a recent meal and puffs out the apricot plumage at her throat. On a particular ledge on the cliff face, two sets of broken shells and one un-hatched brown egg sit in the dirt—remainders of the falcon's unsuccessful nesting attempt.

As biologists for The Peregrine Fund's Orange-breasted Falcon Project, we aim to recover the addled egg, shards, and any feathers found in the area for genetic testing. Much is still unknown about these falcons and we hope this data can shed light on possible causes for their population decline in Central America.

Across the cliff face, I search for a different type of nest. Africanized honeybees, dubbed killer bees from the ferocity of their attacks, also like to occupy Belizean limestone ledges. As a precautionary measure, our climbing specialist always wears a beekeeper hat with netting to protect his face when rappelling to a falcon nest.

The story of killer bees starts in the late 1950s when Brazilian scientist Warwick Kerr imported several hives of *A. m. scutellata,* a subspecies of honeybee native to Tanzania, to an apiary near Rio Claro, Sao Paulo. Through cross breeding experiments, Kerr hoped to create a honeybee perfectly suited for beekeeping in the South American climate. Like selective breeding in domestic dogs for floppy ears or defensive barking, Kerr planned to interbreed African and European strains to get the best of both worlds—mild mannered bees suited to hot climates that produced combs dripping with sweet gold. The genetic cards shuffled

unevenly and the highly defensive traits of the African honeybees dominated the docile qualities of their European cousins.

Although Orange-breasted Falcons nest on cliffs, they feed primarily on birds and hunt over forest canopy. Rampant deforestation due to agricultural expansion leaves nest sites intact, but essentially starves out the falcons. Prior to 1970, Orange-breasted Falcons ranged from southern Mexico to northern Argentina. Due to habitat loss, this non-migratory falcon species now exists in only a few isolated populations—one spanning Belize and western Guatemala, four known nests in a remote part of Panama, and several other undeveloped areas in South America.

Currently, The Peregrine Fund houses a captive breeding population of Orange-breasted Falcons genetically derived from Belize and Guatemala. The resultant young are hand raised and released into the Cayo Mountains of Belize to help bolster the declining species.

Instead of beekeeping, many African cultures have a tradition of bee robbing. When a hive is found, people burn bark and leaves creating plumes of smoke to confuse the bee's alarm scent signals. Then a brave raider sticks his hand in the hive to pull out hunks of honeycomb. Once humans leave, the hive is essentially destroyed. However, people are not the only honey robbers. Creatures like the tenacious honey badger also decimate hives, and various species of birds, reptiles, and insects eat the bees themselves. Additionally, the African honeybees evolved to withstand prolonged droughts and tend to swarm or abscond whenever

resources in an area become scarce. This trait of dividing or leaving the hive makes keeping killer bees difficult.

To contain his experiment, Kerr employed queen excluders in his apiaries. The screens allowed workers to fly in and out of the hive to collect nectar, build comb, and tend larvae, but left the queen and male drones, the only reproductively equipped members of a bee colony, trapped inside. Everything was going well until 1957 when a visiting beekeeper noticed that the queen excluders hindered the production of the worker bees. Like Pandora opening her box, the ignorant beekeeper pulled the screens from the hives, releasing Africanized, aka killer bees into the Americas.

Our climber, Diego, sets up rappelling gear, as a male orange-breasted falcon circles the area and greets his mate with a friendly *eechup*. Rony and I move around the edge of the sinkhole to get a better view of the unoccupied nest. Diego begins his descent while Rony and I shout guidance, “a little to your right, now a little left, great you are right above it, go straight down!” Our voices echo off the chalky walls. The falcons seem unperturbed.

After a half hour of climbing, Diego dangles right in front of the nest, but with his rope caught on an overhang he cannot get to the eggs. Several hundred feet above the forested maw of the sinkhole, he swings back and forth like a child at a playground, but the eggs stay out of reach. Exhausted in the hot summer sun, Diego climbs back up to refuel with lunch, reset his gear, and descend once again. This time he makes it. Crouching on the nest ledge, he carefully collects our samples in a Tupperware container. So far, so good.

When a hive swarms, the queen lays new eggs in specialized “queen cups” which are carefully tended by nurse bees and develop into new, virgin queens. Just before or after her royal daughters emerge, the old queen leaves the hive with thousands to tens of thousands of its working class members. Scout bees fly out to find a new nest site and report back to the colony though the language of movement. The new nest location is decided by a dance competition in which the hive follows the scout bee with the most enthusiastic performance.

The inclination of Africanized honeybees to swarm allows them to reproduce and spread quickly, but is a poor quality for beekeeping. Additionally, the aggressive honeybees outcompete many native species of pollinators for both nesting spaces and nectar, leading to a loss of biodiversity. Sometimes killer bees will even usurp an existing European beehive by assassinating the hive queen and replacing her with their own.

Africanized honeybees will also hybridize with docile bee breeds much to the consternation of commercial beekeepers. When a virgin queen takes her mating flight, male bees chase her. Killer bees can often outcompete their rivals to catch the young queen. And when he does, the force of a drone’s ejaculation explodes his body with an audible pop, leaving his penis lodged inside the female. This plug prevents other males from mating with the queen, ensuring his genes continue into the next generation.

Small population size squeezes a species into a genetic bottleneck, and depending on the robustness of surviving individuals, it can lead to extinction. Isolated populations, such as the Orange-breasted Falcons in Central America, run the risk of inbreeding depression. With no new falcons flying in with fresh chromosomes to spice up the genepool, the birds turn their amorous attentions to members of their own family tree. When closely related individuals

mate, they are more likely to pass on genetic anomalies, such as a weak immune system, to their offspring. If these negative traits proliferate, the whole population can collapse.

Africanized honeybees now occupy all of Central and South America and increasingly spread north through the United States. The first killer bee colony arrived in Texas in 1990 and now occupies at least ten states in the south, including California, Arizona, and Florida. Currently, the only thing stopping killer bees from total New World domination is their inability to survive cold winter temperatures because they store less food than their European cousins. As regional winters become milder due to climate change, the killer bees continue to swarm north.

Unlike European honeybees, which prefer spacious hives, killer bees are much less picky and will hole up in everything from tree cavities, to abandoned cars, to an overturned flowerpot. For this reason, Africanized honeybees are likely to colonize areas near human habitation, increasing the chance of dangerous encounters.

Diego needs less guidance ascending the cliff, but Rony and I still watch him from the opposite edge of the sinkhole. Suddenly, furious buzzing accosts me as a bug repeatedly bumps my face. I shake my head to swat the insect with my ponytail like a horse swishing away flies. *Ouch!* Pain pricks my cheek. Quickly, I scrape out the stinger with my fingernail.

Fear thuds my chest. I am allergic to bee stings, not in an airway-closing-anaphylactic-shock kind of way, but I do swell up more than the average person. Depending on the location and number of stings, my reaction can be more than painful and irritating. It can be deadly. Of all days to forget my epi-pen.

I look down at the now stilled carcass of my attacker and see the gold and black striped body of a normal looking honeybee, but its overly aggressive behavior reveals its genetic code—a killer bee.

Africanized honeybee venom is no more potent than a regular bee's. It is typically the sheer amount of stings that kills a human. I ask Rony to check my cheek. My puncture site swells pink and aches, but less acutely than a fire ant's bite.

About five minutes after the first, another bee arrives and tries to fly up my nose! I snort it out and call a warning to Rony at the spotting scope. The bee changes targets. He smacks it with his black baseball cap and manages to kill the bee. The encounter rattles me.

Like all honeybees, the Africanized version dies when its stinger detaches. This action releases a pheromone attracting additional bees to attack. Killer bee hives consist of many more defender class bees than their domesticated cousins and can rally in the thousands. Worst of all, they hone in on carbon dioxide, the molecules animals exhale, and will buzz in one after another to clog your airways. Africanized honeybees are tenacious and will sometimes chase people for half a mile. Jumping into a body of water does not work—the bees hover over the surface waiting for you to come up for air.

The best way to escape from a killer bee attack is to flip your shirt over your mouth and nose and run far and fast. Sealing yourself into a car or house is also a good option. On the edge of the sinkhole, Rony and I did not have that option.

I move away from the insect carcasses to a spot where I can still see Diego climbing the rope with our samples. If the bees went after him, he would have no escape except to plummet a few hundred feet into the bowl of the sinkhole. Rony kills two more Africanized

honeybees before packing up the scope and joining me in the new location. Thankfully, no other bees follow. Yet, for the rest of the day any buzzing insect makes me flinch.

My cheek swells, making me look half chipmunk, and feels sore like after a visit to the dentist. It takes three days for the venom to leave my system.

If genetic analysis of the egg shells provides evidence of inbreeding, we still have options for conservation. Slight differences in beak and foot sizes between falcon specimens collected from Central and South America hints that these two populations may be different subspecies. In that case, crossbreeding individuals from the two areas could shuffle the genes in a favorable manner and, like the Africanized honeybees, create a more robust offspring.

Even with more than 60 million people in the U.S. sharing territory with Africanized honeybees, fewer than a dozen encounters resulted in human fatalities since the 1990s. Additionally, Africanized honeybees appear less prone to the colony collapse epidemic decimating commercial beekeepers in the United States. Maybe their combative nature extends into their immune systems and they can better fend off the effects of agricultural chemicals in conjunction with mites and other diseases. Killer bees may be more hope than a terror released from Pandora's Box into our increasingly altered planet.

South American apiarists have adopted the vivacious Africanized honeybee. With the correct equipment, modified beekeeping practices, and an excessive amount of smoke to calm the bees, people can safely harvest from their hives. This process singes the honey's sweetness with a slight smoky flavor. An apt taste to reflect the fierce, protective fervor of its makers.

Ground Into Medicine

Squid fishermen haul over 80 tons of writing sea snakes from the Gulf of Thailand each year. During nocturnal squid hunts, conducted every lunar cycle before the moon becomes full, fishermen collect the aquatic reptiles as profitable bycatch.

In Vietnam, barefoot men step into shallow holding tanks of sea snakes and sort through the highly venomous creatures with ungloved hands. One bite from a sea snake can kill an adult human, shut down the nerves, muscles, and kidneys within twelve hours. Yet men grab handfuls of these three-foot-long snakes with the blasé attitude of factory workers. The pale pink bellied reptiles sell for $20 USD a pound.

Baskets of candy cane striped sea snakes are dumped into squirming piles on the floor for weighing and distribution. Swift in water, the aquatic reptiles slump on land, and, despite their deadly venom, possess docile dispositions. When the occasional bite occurs, men try to squeeze blood from the wound. Then a coworker uses a lighter to heat a sliver of rhinoceros horn, yellowish and nearly translucent like mica, and places it on the bite. The keratin of rhino horn holds no more healing properties than fingernail clippings, yet the practice persists.

When a sea snake handler dies, hardly a pause occurs before another man takes his place grabbing fistfuls of venomous reptiles, sorting them into Styrofoam boxes to be shipped live to China. The reward – a modest paycheck to support a family.

Once in China and Vietnam, chefs cook sea snake meat into soups. Restaurants use the whole animal, or sometimes just the blood, in alcoholic beverages. The sea snake’s heart, gallbladder, and other organs become key ingredients in concoctions to alleviate maladies such as joint pain, anorexia, and insomnia.

Two of the top three heart attack medications prescribed in the United States are derived from chemical properties found in snake venom.

Since sea snakes are rarely studied, scientists do not know the exact ecological impact of consuming 225,500 of them from the Gulf of Thailand each year. Aquatic serpents prey mostly on fish and eels, and their disappearance would disrupt coral reef food webs. The human demand for sea snakes is likely to devour the species.

Western black rhinoceros are gone, declared extinct by the IUCN in 2011. Surveys found no individuals in the wilds of Cameroon. No individuals exist in captivity.

Northern white rhinos are nearly gone. The death of Nola in November 2015 at the San Diego Zoo's Safari Park, left only one male and two females, all beyond breeding age, as the last remnants of the species in Ol Pejeta Conservancy in Kenya. A fifth northern white rhino named Nabire died in captivity in the Czech Republic in July of 2015. Her ovaries are on ice in an Italian laboratory for potential in vitro fertilization in the future.

Demand for rhino horn leaves no thought for sustainable harvesting. The five thousand pound animals are shot with automatic weapons and the horns cleaved off their faces with chainsaws. On the black market, a single rhino horn sells for approximately $200,000 USD. Rhinoceros horn, like hair, grows back when shorn.

Male rhinoceroses use their horns for posturing, intimidation, and fighting for females. All rhinoceros dig for roots or to create watering holes with the keratin protrusions on their noses. Female rhinoceroses gently tap the sides of their babies with their horns to steer the young ones until they can navigate on their own.

As a precaution, conservationists trimmed the horn of the lone aged male named Sudan leaving him with nothing more than two hard bumps. Like the Pope or the President, 24-hour armed guards escort the placid Sudan around the park to protect him from poachers.

The roots of this problem run deep in political history. In an attempt to counter Western influences, communist leader Mao Zedong encouraged the use of traditional Chinese medicines, typically derived from plants, animals, and minerals. Folk medicine is still popular in China, especially among the growing middle class. In many Asian countries, rhinoceros horn is believed to be effective against poisons due to its high alkaline content, but modern science does not find evidence to support this claim.

Medicine is not the only reason for rhino eradication. A jambia, a short dagger with a curved blade worn on the belt, is traditionally gifted to young men in many Arab cultures. A hilt made from creamy ivory or yellow-brown rhinoceros horn symbolizes wealth and status.

Some conservationist groups inject pink dye into rhino horns that visibly discolor the keratin and poison humans if ingested. Some groups bore holes into rhino horns and insert tiny cameras to see the danger of poachers approaching clearer than the bleary eyes of the animal that wears it. Despite efforts, rhinos keep disappearing.

Prime minister of Russia, Vladimir Putin, pulls a rope. Metal screeches against metal as a hatch slides open. A young adult Siberian tiger named Kuzya steps out of his crate and smells the earthy scent of the Russian wilderness. Golden eyes survey the area. In minutes, his orange coat and black stripes disappear into taiga forest.

Although the prime minister typically favors industry over the environment, Putin is passionate about big cat conservation. On this 56 birthday in 2008, the former KGB agent

received a two month old, 20 pound Siberian tiger as a present. He cared for the young tigress as it lived in a wicker basket in his home for several days before giving her to a zoo in Southern Russia. Photographs show the prime minister helping biologists examine a sedated Siberian tiger and affix it with a radio collar. The animal's paw is as large as his face.

Approximately 3,200 tigers survive in the wild worldwide. Less than 500 of those belong to the largest subspecies, the Siberian tiger, which can grow to 800 pounds and are known to kill and eat bears. A tiger carcass sells for around $10,000 USD on the black market. From whiskers to testicles, the top tier predators become commodity in the East Asian traditional medicine trade.

In December 2014, satellite tracking showed the tiger named Kuzya, rescued and released into the wild to aid conservation efforts, as he swam across the Amur River and ransacked livestock in remote Chinese villages, supposedly eating several chickens, goats, and a dog. To avoid an international incident, scientists called government officials and locals were warned not to shoot Putin's tiger. The big cat managed to avoid snares and poachers for two months before crossing the icy Amur River again.

As tigers become scarce in the wild, poachers turn to other sources to supply the demand for exotic animal parts. In September 2012, poachers broke into the Itanagar Zoo in India, tranquilizer darted a tiger, and hacked the half-conscious animal into pieces. Guards arrived before the poachers stole away with their victim.

Apart from the frequencies of purring which can help heal bones and relieve stress, Western research finds no medicinal properties in felines. Remedies made from tigers supposedly cure everything from cancer to impotence. Often, poisonous substances are added

to the mix of medicines so customers feel some sort of affect from ingesting parts of dead tigers.

At the international Tiger Summit in St. Petersburg in 2010, Putin shook hands with the leaders of some of the few remaining countries containing wild tigers—China, Bangladesh, Nepal, Laos—and made small talk with NGO representatives and the World Bank Group. The conference, held in the Chinese zodiac year of the tiger, opened with the warning: if serious conservation efforts are not made, no wild tigers will exist when the next year of the tiger arrives.

In middle school, my brother suffered debilitating migraines that kept him home for days at a time. This was in the 1990s before pharmaceutical companies developed and marketed affordable drugs to soothe the demand of aching American minds. Acupuncture seemed to help.

The small acupuncturist office in Seattle smelled of dried dead things. The old Chinese practitioner sent my brother home with a paper bag of ingredients for a special tea to rid his body of built up toxins. It contained leaves, shards of oyster shells, and dehydrated bee carcasses.

Curious, I sampled the pungent brown tea that my brother sipped cold through a red and white stripped straw. A sharp, bitter musk hit my tongue and I fought not to gag.

Years earlier, while playing in the woods, my brother and I stepped on a yellow jacket nest and suffered multiple stings. Somehow, the dead bees in the acupuncturist's tea loosened that long held venom from his tissues—the old sting sites re-swelled and dispelled.

Eventually, my brother outgrew his migraine headaches. Perhaps the traditional Chinese medicine did the trick. I cannot claim that Western science and medicine has all the answers. Indeed, big pharma comes with its own commodity pitfalls, especially for impoverished communities. Truly, money and markets, vanity and desperation, drive the traditional Chinese medicine trade just as they do for Western medicine.

How to kill a market: simple economics—erase demand, or erase supply.

Four US based biotech companies race to develop synthetic rhino horn in laboratories, which if successful could shift markets by lowering prices enough to make poaching unprofitable. Indecently, it could also increase clamoring for "the real thing."

A survey of Chinese citizens revealed a commonly held belief that elephants tusks just fell off the animal. People did not realize that, like the rhino, the huge grey beasts were routinely slaughtered with semi-automatics and their faces mutilated for ivory or horn. Upon learning the truth, many people pledged to never buy ivory again and condemned the trade.

Nestled between China and India, the small Himalayan country of Nepal achieved 365 days of no poaching, twice: in 2011 for rhinos, and in 2013 for rhinos, tigers, and elephants. With continued monetary and regulative commitment from the highest levels of government combined with on the ground enforcement from rangers and community antipoaching patrols, it can be done again. We can inhabit in a world with living sea snakes, rhinos, and tigers only if we demand it.

Broken Ocean

Wave-carried to shore, heaps of dead coral strike tinkling chimes as they shift under my bare feet. I select a piece to inspect. I want to say it's like a tree, but unlike a tree, these branches grow into one another. They connect, forming triangular passageways. I imagine tiny fish hiding inside this labyrinth. Millions of microbes, plankton, edible particles, flushed through these channels with the current and caught in the feather-hands of polyps.

These were the images promised by the airplane welcome video: soothing orchestral music accompanies an azure sea slug rippling over the ocean floor. Clown fish dance in the tingling embrace of anemone. A school of neon yellow shifts in legato. Peach, mauve, citron corals reach for sunlight, fingers splayed.

Cut to black.

When planning this trip to the tiny isle of Gili Meno in Indonesia, I jokingly said to my travel companion Meghan, we'd better see the coral reefs before it's too late. Climate change experts estimate that by 2050 nearly all coral reefs will be gone. However, the physical reality of seeing the reefs before they die is a lot like visiting a beloved relative in hospice care.

Treading carefully on a million broken skeletons lining the beach—*is this our future?* Still recovering from jetlag, I bend to pick up a shard of shell. Once the conical end of a mollusk's home, it now spirals into an infinity of creamy depths. I pick up another piece. This purple fragment bears pockmarks upon close inspection, and I wonder if the ocean's rising acidity bit these craters into the calcium carbonate. The ocean absorbs much of the carbon dioxide we emit through the industry of burning fossil fuels. This chemical influx lowers the pH of saltwater at a rising rate and eats away at the hard structures of sea

creatures: snails, clams, crustaceans, diatoms, corals included. Without these backbones of the ecosystem, the oceans will collapse. I reach for a small white shell, but to my delight it skitters away on hermit crab legs.

The tide goes out in the evening. I crouch beside the clear pools created between seaweed covered rock shelves. Various sizes of hermit crabs wave antenna and scuttle along. A fist-sized sea urchin, its center the shape of a star, its spines plum colored, grazes on algae just below the surface. A blip of movement and I spot a white goby; the fat cheeked little fish perfectly camouflages into the substrate of broken coral bits.

Growing up, my family took weekend trips during the summer to the rocky beaches along the Washington and Oregon coast. I spent hours peering into tide pools at the flowing hair of anemones, marveling at the tube feet of a flipped over starfish, and overturning stones to catch dime sized crabs. I worry about when the next generation grows up on a planet devoid of natural coral reefs and films like the airplane welcome video or *Finding Nemo* seem as fantastical as *The Little Mermaid*, or because blue tangs like Dory do not breed in captivity like other tropical species. I worry about the loss of wonder which inspires us to value the natural world as sacred.

The next morning, Meghan and I rent snorkel gear and duck-walk into the waves. A few flipper kicks from shore and we find live corals. Some look like unfurling cabbages edged with turquoise. Others like blue-green branching webs. Most are conglomerates of jagged ochre. We slip above them surrounded by schools of quarter-sized, iridescent fish. Like neon signs they flash teal, pink, baby blue, lemon as refracted light dances over their scales. Silver,

and almost invisible near the surface, a group of fish with long noses hover like living hypodermic needles. Sticking close to the protective crevasses of coral we see triangles of black, white, and yellow angel fish. I recognize parrot fish by the sound of their coral crunching beak mouths. Most species I have no names for: midnight velvet fish with one slash of sunset, dizzying mazes of zebra stripes, wedges of magenta checkered with butter, electric sapphires with fins, psychedelic snippets of scales, spots, splotches, slashes.

Indonesia comprises a corner of the Coral Triangle, a marine area in the Western Pacific Ocean boasting over 600 different species of reef building corals. To lose the corals is to lose this wonderment of biodiversity. Millions of interdependent species will disappear, from tiny worms to reef sharks. If the loss of beauty does not devastate enough, various delicious fish, like grouper and snapper, also need living reefs.

Over 120 million people live in the Coral Triangle and rely on it for both subsistence and commercial fishing. Ecotourism, such as diving, snorkeling, and sports fishing, creates jobs and contributes to a large portion of the GDP for many developing nations. Plus, coral reefs act as underwater barriers and can slow down storms, lessening the devastation of hurricanes on coastal communities, which are on the rise due to climate change. I can hardly imagine the ecological and societal impact that the loss of coral reefs will have on places like Gili Meno.

These are the worldwide results of coral reef loss due to overfishing, pollution, and climate change that scientists can predict with near certainty: starvation and devastation. Millions of people living in coastal communities which rely on fish as a staple diet will face famine, the 38 million people employed in the global fishing industry will be jobless, fierce

storms will ravage the coasts, killing even more. The ocean will return to a Precambrian state of sludgy algal mats and jellyfish, how it looked before fish even evolved.

What scientists cannot fully predict: what will happen to terrestrial ecosystems when we rip the fine fibers of nutrient exchange between the oceans and the land.

Already I see the evidence of loss beyond the mounds of coral corpses lining the beach. Last night, Meghan and I walked the sandy path that rings the whole island and sized up the various menus of the beach side restaurants. Most of these are casual affairs with tables and chairs in the sand, American pop music, and tiki torches or strings of Christmas lights. A fancy little hotel, the poshest place on Gili Meno, advertised fresh caught tuna as the dinner special with a high price tag. Tuna are an ocean swimming species, not a reef fish, but they thrive within the Coral Triangle and the multi-billion dollar tuna industry devastates their numbers with overfishing. Other seaside establishments showcased slimy skinned squid and a few medium sized of silver scaled fish ready for the grill. Large fleshy species like grouper are notably absent.

While now illegal, locals used to fish with dynamite, throwing lit sticks of TNT into sensitive reef areas and blasting everything underwater. Fishermen scooped up net-fulls of shockwave killed fish, hours of line fishing compressed into single abundant explosion. The effects of unsustainable dynamite fishing still ripples through the ocean and human communities. Overfishing alone could cause the ocean to collapse, but it is exacerbated by accelerating climate change and pollution.

Is it naive of me to still say there is hope for coral reefs, for the ocean, for people living in places like Gili Meno? It would be defeatist of me to say we should not try.

The Gili Eco Trust in conjunction with the Global Coral Reef Alliance and with the support of the local tourism industry, use Biorock technology to stimulate coral recovery. Invented by Wolf Hilbertz and Thomas J. Goreau, Biorock consists of steel structures electrified with low voltage to cause a chemical reaction called electrolysis, which creates a perfect substrate for corals to attach and grow upon. The electric current is too low to harm living creatures and actually stimulates growth. Hard corals attached to biorock grow 2-6 times faster than in natural conditions, heal from damage 20 times faster, have a 50% higher survival rate in rising ocean temperatures, and produce new coral quicker than anything recorded in regular reefs. Fish living in and around the Biorock structures also mature more rapidly, and the new coral keeps beaches from eroding by slowing down wave action, just like a natural reef. Perhaps with innovation and determination we can mend our broken bones.

The Myth of Cleanliness

Living and working in Belize for The Peregrine Fund, I developed an affection for vultures. My main focus was falcons, as my team hand raised and released threatened Orange-breasted Falcons into the mountains of the small Central American country and studied the wild population. However, on a typical day at the release site, I usually saw three different species soaring overhead or spiraling up thermals in the mountain valleys below – Black Vultures, Turkey Vultures, and the majestic white King Vultures, crowned with yellow heads. I came to recognize one frequent Turkey Vulture visitor by a missing patch of secondary feathers on one wing. I imagine they were blown out by buckshot from a kid using the black birds as target practice at a local garbage dump.

Another vulture nestled in my core after settling soggily on a branch at the release site after a rainstorm. His long red face and dewy black eyes made me think of a horse. I knew my dark garbed visitor scented the soaked quail carcasses set out as falcon food on the platform. Half of me wanted to let him clean up the putrefying carrion, but I knew better than to reward a scavenger's begging. Vultures are quite intelligent and once they learn of an easy meal, they will be sure to check back in the future. Hence, why they become frequent visitors of dumps and meat processing plants. In the wild, vultures have even learned to follow predators, such as wolves, for the eventual leftovers.

At the release site, our fledgling falcons sometimes chased the cruising scavengers. This may have been a territorial instinct or a way to keep vultures from thieving cached food, but from the ground, their aerial dance looked thrilling. Vultures lack voice boxes, so their entire vocabulary comprises of hisses, but they can make plenty of sounds with their wings. Lazily circling vultures are silent, but when chased by a falcon, the large birds flap their

broad wings with a loud *thwap-thwap* like snapping a sheet fresh from the dryer. Wind sings a shrieking whistle around their feathers as they stoop in time with the falcons. The carrion eaters are surprisingly graceful in flight. The way they tilt with the wind reminds me of sailboats on the water.

I know my vulture infatuation is uncommon. These birds don't typically win popularity contests with their bald heads and association with rotting flesh. Plus, they have some gross habits such as pooping on their legs to keep cool and projectile vomiting as a defense mechanism. Nevertheless, they deserve our appreciation. By eating dead things vultures help maintain a healthy ecosystem and greatly reduce the spread of disease. Without vultures, carcasses of large animals take weeks longer to decompose. In essence, they work as nature's sanitation crew.

Americans believe in the purification power of chemicals. In a healthy ecosystem, nature does the work for us. When we disrupt these processes or create artificial environments, we must deal with the consequences.

Take eggs for example. In The United States we refrigerate our eggs, but most other countries do not. The distinction results from our cultural views on cleanliness, namely how we choose to confront the possibility of harmful bacteria. When it comes to chicken eggs, *Salmonella enteritidis* is public enemy number one. Americans don't want to welcome that or any other harmful bacteria lurking around the chicken coop into their kitchens.

However, when a bird lays an egg, it has a cuticle barrier preventing bacteria or fungus from infecting the inner chambers. With this natural system, an egg can stay fresh from the farmhouse for about 21 days, no refrigeration needed.

In the 1970s, the United States Department of Agriculture began to require that all egg manufacturers conform to a mechanized cleaning system. Now, soon after eggs emerge from the backside of a chicken, they trundle along a conveyer belt and undergo a hot wash with chlorine and water. This disinfection process disrupts their natural barrier, making them porous and more exposed to invaders than before. As a result, we protect our eggs by sometimes coating them with oil and always refrigerating them, an expensive and energy consuming luxury. On the up side, chilled eggs can stay fresh for nearly two months. Even with this technologically enhanced washing method, salmonella contaminated eggs cause about 142,000 illnesses a year in the U.S., according to the Food and Drug Administration.

This process focuses on creating squeaky clean eggs on the outside, but ignores the underlying cause of salmonella in the first place: namely, unhealthy chickens. When thousands of birds share close, shitty quarters, as in factory farming situations, illness can spread quickly. *Salmonella enteritidis* can infect a chicken's ovaries and be bundled up with the yolk before being sealed inside a shell. Washing only removes bacteria on the outside of the egg, but the inside still holds an intestinal time bomb. This is why you were told never to eat raw cookie dough. Proper cooking usually kills bacteria.

In Europe, egg producers vaccinate their chickens to keep the birds infection-free in the first place. Some U.S. companies sacrifice a sliver of profits to take this preventative measure, but the government does not require it. Of course, better living conditions for the hardworking birds could also aid in reducing the spread of disease. Animal welfare concerns aside, the idea of surface purifying the end product rather than confronting the underlying cause or taking preventive measures seems to typify the American approach to cleaning up manmade messes.

When this is taken to the extreme, excessive sanitation can actually cause more human health problems than thwart them. A 2015 study in Sweden found that children raised in households with dishwashing machines had a significantly higher probability of developing asthma and allergies than children who dined on hand washed dishes. Microbial exposure during early childhood stimulates the immune system and makes it stronger. Soapy water and a sponge leaves behind more bacteria for children to build resistances against early in life and helps stave off health problems later. Children who ate fermented foods, which are naturally laden with probiotic microbes, and who consumed food bought directly from local farms both had decreased cases of asthma and allergies. Chemical cleanliness is a way we try to control our environments to make life better and easier, but sometimes, the old ways are the best ways.

In many parts of Africa, it is a common practice for farmers try to protect their herds by tainting dead livestock with poison. They leave this laced meat on the edges of their farms to kill predators in the area like lions and hyenas. Innocent vultures, whose stomach acids can neutralize threats such as anthrax and botulism, come to feast on the contaminated remains and end up unintended victims. A circling vortex of vultures can point park rangers to a big kill from miles away. To mask their crime, poachers sometimes poison elephant carcasses to fell the indicator birds, buying time for ivory snatching and vacating. On top of that, in some areas the vultures themselves are poached and their parts used to make votive items. As a result, several species of African vultures are now endangered. This is not only bad for the birds, but for humans as well.

In the 1980s as many as 80 million White-rumped Vultures soared across the skies of India. A mere 20 years later, only several thousand remain. Other vulture species suffered similar losses. The culprit: diclofenac, an anti-inflammatory drug widely administered to cattle to treat the symptoms of disease or infected wounds. Much like how chickens in Europe are vaccinated for *Salmonella*, diclofenac allows ranchers to raise cattle in unnaturally large herds for commercial production. Innocuous to mammals, just one meal of drug-laced cow liver equals a quick ticket to heaven via kidney failure for a vulture. People in India traditionally relied on the winged cleanup crew for disposal, and with them gone, rotting cow bodies pile up on the outskirts of populated areas. The half gnawed, meat-gummed bones of hundreds of dead cattle looks like a fly infested apocalyptic wasteland.

Taking advantage of the free food, large packs of feral dogs and swarms of rats eat the remains and slink around garbage dumps. Without the strong digestive juices of vultures, these mammals act as disease vectors. For example, half the world's total of rabies fatalities each year, about 30,000, occur in vulture-barren India.

Alarmed by the decimation of vultures, Dr. Lindsey Oaks from the College of Veterinary Medicine at Washington State University and his team worked with The Peregrine Fund to identify the common cattle drug as the culprit. Thanks to their efforts, diclofenac is now off the market and menu in India, Nepal, and Pakistan, but vulture populations have been slow to recover.

The Peregrine Fund, along with other non-profit organizations, continue to work to stop the practices of purposeful and accidental poisoning of wildlife in Africa and India by educating the public. It is not a localized issue. Vultures from Africa migrate up into Europe to perform their vital services there, too. In the United States, California condors, a species

that once dined on mastodons, struggles for survival against lead poisoning, resulting from its common use as ammunition by sport hunters.

In a case of contradictions, we rely on chemicals to sanitize our food and living spaces to the point of impairing our own immune systems, and we murder millions of members of Mother Nature's disease disposal crew. The fall of vultures into the endangered or critically endangered category is not just the sad loss of unique creatures, it is an upending of a natural system that helps keep us safe. No amount of hot chlorine baths will fix that problem. Perhaps it is time to revise our myth of cleanliness, look beyond trying to order our world to work for us, and strive to prosper within the world's order.

SECTION 6:

ORGANA SENSUUM

Poetry

Bodies Exhibit – Nervous System

like the roots of weeds
yanked from the bed

and shaken so all
the good dirt falls off

fine mesh
soft as baby hair

laid on concrete
to dry

the nervous system
holds the shape

of the human
it once was

as if
dendrites and axons

still send signals
for sleep

Mesocarp

The fleshy part of a fruit.

This fruit was once a bee
buzzing in the open mouth
of sex.

Was once a single grain
dabbed onto a waiting tongue,
a pollen tube grown and swallowed.

A hard lump at the base
after all the petals
fell.

A repository of sugars.
A nursery of waiting trees,
until your devouring.

Science Says

Hiccups are left over
from a time when we had gills.
I must remember
I absorbed my tail
in the womb.
I am not a fish.

99.8 percent of ourselves
we share
with our closest animal
relative.
What lurks in the 0.2 percent
I keep to myself?

Dolphins call each other
by name.
Birds sing, and dance,
and arrange objects as art.
Octopi construct shelter
from discarded coconut shells.

Viral DNA twines
within our core
from when we opened
our code
and allowed the enemy
to integrate.

More microbes
than human cells,
live inside my body.
I must remember
I am more than a home
for me.

I Am the Bull in the China Shop

A red bull strutted in stone
upon my palm
in the Mexican gift shop.
I thumbed his smooth surface.

“No Tocar” the sign read.
I should have heeded
“Do Not Touch.”

Was it the distrust of others
that loosened my caution?

By then, I should have known
my fumbling fingers,
should have been too old
to sit on the sidewalk
and cry
hot shame.

I swear he was damaged
before my touch, but
I had to pay for
the storm-cloud bull
with the broken horn.
I had to take him.

I place him on my dresser
with the smooth red bull,
let them watch me
dress and undress,
broken and unbroken,
until the shame
dries cold.

Plasmodesmata

Think of how much we could share if passages connected us. Like the channels linking cell
to cell in the root hairs of plants, we could move through us the vibrato of a sparrow's trill, or
the thick licks of an oil paint sunrise. Skip the imperfection of the spoken word, and slide
truth between two bodies like

plasmodesmata
pull water against the weight
of all gravity.

The Electrical Eel

A fish of disagreeable appearance:
coated with a fort of mucus,
destitute of scales,
the head, a little depressed.

Yet, exerted at the animal's pleasure
the power of the heavens.
Its existence supported
by the crackle of electricity.

Instantly stupefied,
smaller fish fall
prey into the coils
of the electrical tyrant.

When Death Becomes White Noise

Yellow arches glow in the night
across from the used car lot
where a pigeon squawks in pain
answered by a falcon's recorded cry.
The cycle repeats
an endless threat of terror
deadening nerve endings.
The pigeons sit unruffled
when death becomes white noise
and shit on the cars below.

Kenyan Runner

I glimpse him from the bus window,
his arms swing at right angles
his face intent, muscles taut
under sweat sheened skin
that reminds me of the taiga
earth back home,
rich like crumbled chocolate cake,
moist and loamy,
with the power to nurture trees into giants.

Here in his country, the earth
is worn soft like raw flour
or sun baked hard
red, like the dye made from beetles
collected by women
from the flat sides of cacti.

I wonder if he sees his skin
like the slash of a zebra's stripe
or the rosette of a leopard's spots.

I wonder if he sees my skin
like the soft meat of a nut
or dry grasses rustling under the sun.

Navigating Iowa

Subtle contours shape the land like dough flattened with the palm of a hand rather than a rolling pin. Corn and soy fields dip slightly toward waterways. A long stretch of trees indicates a creek or river. Inside a square patch of trees, you'll find a person's home.

Iowa is not as empty as it seems. Fireflies fill humid summer nights. They spark up like little rockets from leaves, blip out before the bang. At dusk, you can see the beetles' long orange and black bodies, their wings a whirr of smoky glass. In full dark, under tree canopy, they become stars at human height, a walk through winking galaxy.

Look at the edges. Look where red-winged blackbirds nest in tangled grasses along the highway. Find raccoon prints in the creek mud where it dug for clams. Take the clam shells home. Or, better yet, pry a fossilized bison tooth from the river bank, or a geode to crack open. Look up in autumn to see migrating pelicans floating on wind currents like a cluster of white balloons released from a child's hand. When ice fishers set tents on the lake, search for swans among the Canada geese. When spring blooms, go to the prairie.

Just a Snake

In Trinidadian culture, if you dream of a snake
she embodies your enemy.
You must kill her.

The modern dream almanac says snakes represent change,
the past peeled off as dead skin.

The Hindu god Shiva wears a live cobra
wrapped three times around his neck,
past, present, future.

In ancient Greece, snakes slithered the dormitories
in the temple of Asclepius, the god of medicinal arts.
Visiting supplicants slept among the serpents
and priests translated dreams into prescriptions.

The Aztec worshiped the feathered serpent,
Quetzalcoatl, deity of wind and learning.
His myths murdered in Spanish conquest,
lost in the coils of time.

Snake venom kills by attacking blood or nerves,
but if milked can treat heart disease or diabetes.

The World Serpent encircles the globe
biting his own tail. Ragnarök begins
when this son of Loki lets go.

Sometimes a snake wakes you up
as a caught breath on a morning hike,
coiled on a rock ledge so close you can see the vertical
slits of her pupils, a tell of the venom in her fangs.
Each of her scales a diamond cut into mottled overlay
of long muscles tightened to strike or flee.

Sometimes a snake desires the heat
of a newly risen sun more than she fears you.

Dementia

I watch every day as you begin to unknow me,
like the spooling out of caterpillar silk.

Before your metamorphosis, each day dribbled
down our chins like ripe mango juice.

Now, to be with you, I move as water through dust,
a crystal worm seeking the least resistance.

The maggot eats everything but the edges,
and I am left holding your rind.

Winter Stream

We preserve
the forked hoof print,
the caution of bending
to kiss and take us
in red ways.

We collect
the shortest day in winter,
harden the morning inside us
to save the disappeared days,
the last exhalations of leaves.

We hold
until the crack
of concentration,
sun-sharded memory
slips downstream.

SECTION 7:

CLINE

Creative Nonfiction

Becoming Caretakers

The map names it Angel's Road, perhaps because one wrong jerk of the steering wheel along the narrow mountain spine would send us straight to the heavenly host. Or perhaps because it provided expansive views of the surrounding hills and valleys, ridged like crumpled paper, that surely only those with wings ever see. Roni – local Belizean, expert birder, and a fellow wildlife biologist – gives directions as I drive down the range. Issana, my friend visiting from the United States, snaps pictures from the back seat as tan spray from potholes splatters the windows. We park where the road erodes too much for driving, heft our packs, and continue on foot.

The muddy waters of the Macawl River slither in the valley below, its banks marred by the black remains of trees. Beyond the skeleton forest, verdant grass spreads on the upper flood zone and eventually gives way to thick, dark jungle. I first read about this river in the book *The Last Flight of the Scarlet Macaw* by Bruce Barcott, which was recommended to me when I started working in this small Central American country. The book outlines the fight between conservationists and the Belizean government over the construction of a small hydroelectric dam, specifically as it would imperil the already endangered Scarlet Macaw population by flooding nesting sites along the river's banks. Well, the dam went up and the trees went down. I could see that recent history written in dead wood.

Yet, the real threat to Scarlet Macaws comes not from the dam, but from poachers. These poachers, locally called Xateros, are usually poor Guatemalans who sneak across the border to steal parrot chicks, harvest fish-tail palm for floral arrangements, hunt jaguar for pelts, and anything else they can take from the Belizean National Forest to sell on the black market. To discourage this, the Belizean government's Friends for Conservation and

Development (FCD) conduct armed patrols of the area. Poachers, wary of the FCD, tend to run whenever they see anyone in the jungle. The FCD cannot cover the entire forest, so the Scarlet Six Biomonitoring Team, a non-profit organization, spends months living in the Chiquibul to track the macaws and to deter poachers. This is why Issana and I decided to spend the weekend camping in the rainforest during the rainy season.

One current question of conservation biology is how to combat abject poverty and ecological ignorance at the same time. In an article titled "Conservation in the Anthropocene," P. Kareiva, M. Marvier, and R. Lalasz write "If people don't believe conservation is in their own best interests, then it will never be a societal priority. Conservation must demonstrate how the fates of nature and of people are deeply intertwined – and then offer new strategies for promoting the health and prosperity of both." Implementing community-based conservation is one such strategy. It aims to shift how humans interact with wilderness and promote sustainable development while conserving or restoring biodiversity and critical habitat at the same time. Its core tactics include: empowering local communities by involving them in conservation decision-making, promoting active participation in local resource management, incorporating indigenous knowledge, legitimizing community property rights, community development like building bridges and schools, and improving people's economic welfare. In the past few decades, an increasing number of organizations have attempted to implement this social-ecological practice of community-based conservation with varying degrees of success.

Integration of social science information with biological data forms the foundation of community-based conservation and can require the teamwork of scientists, anthropologists,

government and non-government organizations (NGOs), local leaders, interpreters, and many others to design an inclusive plan of action. The people living in and around areas of ecological interest often encompasses different religions, cultural practices, social-economic standings, and sometimes languages. No simple conservation blueprint can apply to every community. Instead, community-based conservation must be custom tailored not only to every geographic region, but to every individual situation. For example, one area of the Philippines developed a successful community-based marine protected-area, but the same approach met with failure when replicated throughout the country with little attention to social context. In fact, international trends reveal a scarcity of successful community-based initiates despite its growing popularity as a conservation strategy.

What interests me is not what leads to the failure of a community-based conservation project, or the political maneuvering involved in starting a project, but how successful community-based conservation and environmental education can foster a positive attitude towards conservation in a local community. How it can increase people's appreciation for the natural world. The first step to minimizing human impact on the Earth is getting people to care. The next step is empowering them to do something about it. This is exactly what community-based conservation aims to accomplish, which makes it more appealing and more sustainable than traditional forms of conservation.

Heading into the jungle, this was my chance to take part in community based conservation to save Scarlet Macaws in Central America. As head of the Scarlet Six Biomonitoring Team, Roni regularly sojourns into Chiquibul National Park with his team of locals to research and protect the 100 or so Scarlet Macaws living wild in Belize. The crew boats up the branching

river and camps in the jungle near various nest sites during the week. On the weekends, Roni takes volunteers, like Issana and me, into the forest to give the regular team some time off.

As sweat dribbles down my back, I hear the soft *plea-plea-plea* call of an eagle. We pause and I catch sight of a huge black bird, its tail smiling a crescent of white. A snake clutched in its talons waves behind it like a streamer. The adult Solitary Eagle perches on a snag across the valley and gives the serpent to its single juvenile offspring. Roni spotted this young bird for the first time just a few weeks ago, making it the third recorded juvenile Solitary Eagle seen in Belize in just two years. In addition to conserving macaws, Roni also works for the Belize Raptor Research Institute, which is pioneering studies on this rare and barely studied bird.

When people live hand-to-mouth, like many if the xateros, it is hard to justify leaving any available revenue or food source untouched. The pressures of poverty make it easy to justify stealing parrot chicks from the rainforest to sell on the black market or hunting bushmeat to feed a hungry family. People in such situations often cannot afford to maintain a sense of wonder and respect for nature.

However, many indigenous cultures across the globe recognize a spiritual relationship between people, the land, and its creatures, and the fine balance needed to live together sustainably. Some cultures even institute conservation practices. For example, the Maori of New Zealand implemented *rāhui,* restrictions or bans on the gathering of certain species, such as godwits or eels, which allowed a food source to recover and prevented harvesting to extinction. Colonialism wreaked havoc on indigenous cultures around the world, often forcing assimilation and eradicating native land use practices, medical knowledge, language,

and religious beliefs. The invaders filled these gaps with a culture of exploitation and rewired the relationship between people and their natural landscapes.

As a colony of Great Britain until 1981, Belize is a prime example of the loss of ecological knowledge. *The Last Flight of the Scarlet Macaw* includes a scene set in the early 1980s, where an old creole man wanders the new Belize Zoo describing how each animal could kill a dog or cause human impotence. However, at the end of his visit, tears stain his cheeks as he thanks zoo founder Sharon Matola for showing him the natural treasures of his homeland. Matola notes that "most locals saw the wild animals around them as either dog-killers, eye-blinders, or supper. Bush myths about the supernatural powers of tapirs and jaguars instilled fear in people, which fed the instinct to shoot first and ask questions later." Such experiences inspired Matola to integrate environmental education into the heart of the zoo. She was appalled to find that "Belizeans lived in one of the earth's great cradles of life, yet most knew almost nothing about it. They didn't even know any names! Jaguars were called tigers. Pumas were called red tigers. Ocelots were called tiger cats." Schools used British textbooks that outlined ecology in England, leaving Belizean children ignorant of their local landscape. Matola has since worked to revamp the environmental education system. If people are ignorant about the wildlife living around their own cities and homes, then how can we expect them to care enough to save it?

We reach the river to find our boat stranded in a dry area about 60 feet from the water's edge. At the height of the rainy season, the water should be up to the tree line. Roni, Issana, and I haul the heavy inflatable, pontoon-like vessel to the river's edge. We uncover a small neon orange frog squatting in the moist earth.

Meanwhile, dark grey clouds prowl the sky. Just as we start to push away from shore, the wind begins to squall. Modest waves sweep us back to the bank. Our eagerness unfazed, we don rain jackets and fit waterproof covers over our packs. Using oars and a metal rod, we punt around branches that reach out of the river like hands of the dead.

Once we make it to deeper water, Roni roars the motor to life and we speed straight into the growling maw of the storm. Rain stings my face like warm hail. My ten-year-old rain jacket cannot withstand the onslaught. Water streams down my body and puddles in my shoes. Issana tries to take some photos, but moisture seeps into the machinery of her camera and it shuts down. We steer through warm wet misery. Twenty minutes later, the rain lessens to a drizzle and the river curves toward blue skies.

A crocodile splashes into hiding as we approach. Kingfishers dressed in jeweled greens and blues gulp silver minnows. A brown plumed Montezuma Oropendula breathes a bubbly call sounding electronically alien. Cormorants swim past – their long necks and heads sticking out of the river until they kick up wings and run along the water's surface, flapping hard until airborne. An orange two-foot-long iguana waddles into tall grass along the bank. Keel-billed Toucans croak like toads as they forage for fruit. Little Green Herons, Tiger Herons, a Great Blue Heron.

Then, a flash of red. There is no hiding a Scarlet Macaw. Their squawks pierce the jungle and bright rainbow plumage shines against mellow green leaves. A pair perches together in a tree on the far bank. Our soggy state forgotten, we grab binoculars and watch them preen red, blue, yellow, green feathers with black and white hooked bills.

One historically common conservation strategy is to denote a certain area of habitat as a preserve or park and to exclude human settlement, resource extraction, or development in what is known as fortress conservation. As a safe-haven for bison, wolves, sage grouse, and many endangered species, Yellowstone National Park serves as a shining example of how parks and preserves can promote and even restore biodiversity. In 1912, John Muir wrote in *The Yosemite*, "Everybody needs beauty as well as bread, places to play in and pray in, where Nature may heal and cheer and give strength to body and soul alike." Influential writers of the nineteenth and early twentieth century, such as Henry David Thoreau and John Muir, stressed appreciating nature for its intrinsic value and the importance of wild lands to people's health and spiritual well-being. This transcendental philosophy sparked the initiation of the first wilderness conservation area – Yellowstone National Park. With over 3.5 million visitors in 2013, Yellowstone seems to be fulfilling its intended role of promoting a sense of wonder and appreciation for the beauty of natural landscapes. However, not everyone can afford the travel or entrance fees to visit a national park, especially in developing nations, making 'pristine' wilderness a pleasure for the elite.

Additionally, Yellowstone's foundational philosophy viewed wilderness as a place free from humans. This included the Native Americans who traditionally used the land. According to the article "National Parks and American Indians: Yellowstone,"

> In 1887, Yellowstone National Park officials complained that the Shoshone band under the leadership of Major Jim had been burning grass near the park and that the tourists were nervous about having 'wild Indians' in the area. The Shoshone felt that they were unable live on the rations issued at the reservation and thus needed to hunt in order to live. Burning the grass was a standard Indian way of managing the land

> and increasing the yield of deer, elk, and other mammals. Regular burning allows for a larger carrying capacity. Many non-Indians, however, felt that burning was bad for the land.

Native Americans were not only pushed off the land, and their environmental management strategies extinguished, they were then forced to pay park entrance fees if they wanted to visit traditional sacred sites. The U.S. government has since rescinded these fees, but this colonial approach of forcibly taking land from others continues in fortress conservation models around the world. The Chiquibol National Forest in Belize falls into this conservation category. While the fortress method can sometimes successfully protect biodiversity, this exclusionary tactic only serves to reinforce the idea that humans and nature are two disparate things and that wilderness can only exist without humans.

Today, much of the conservation community focuses on designing and establishing similar reserves in countries worldwide as an important part of 'preserving national and cultural heritage.' This traditional top-down approach to conservation focuses on the government, or similarly powerful organization, fencing off an area of wilderness or critical species habitat and restricting human use and access to that preserved region. J.N. Mehta and J.T. Heinen conducted an empirical study in Nepal and found that "the army was deployed in these parks and reserves to protect forest and wildlife resources form people. The revenue earned from park/reserve management (mainly entrance fees) went directly to the government and little, if any, returned for local level development." This colonial approach of appropriating land from local and indigenous communities and restricting their access to resources such as game and firewood creates resentment rather than appreciation towards conservation practices and park-people conflict.

Additionally, the fortress model sometimes displaces locals, forcing them to move with little or no reparation, and disrupts or destroys their traditional economies. It fails to take into account that in some areas historic practices of farming and resource extraction by indigenous peoples may actually be beneficial to biodiversity enhancement, such as burning grasses to increase game. Many times insufficient funding is provided to maintain and patrol park boundaries. Bitter locals with disrupted livelihoods may resort to illegal logging or poaching, which counteracts the action of creating a wilderness preserve in the first place. Community-based conservation, on the other hand, is designed to counteract these negative impacts on people's lives and promote social-ecological cooperation. To help them reestablish a mutually-beneficial arrangement between humans and nature.

This is my third time seeing Scarlet Macaws in the wild, and Issana's first. Issana and I met while working together at a small zoo in Washington State that houses a large collection of birds including several Scarlet Macaws. Working so closely with birds possessing the intelligence of three-year-old children and personalities to match, it is hard not to feel an emotional attachment to the colorful species. I feel both jarred and jubilant to see Scarlet Macaws in the canopy rather than waving their feet and saying hello to visitors.

Roni navigates our boat further up the Raspaculo branch of the river. We keep our eyes on the water to avoid large rocks squatting under the surface. Tannins released from decomposing foliage give the waterway a tea-brown tinge.

We pull up to the bank and tie our boat to a dead tree. Rapids impede any further travel up river, but we have reached our destination – a wild Scarlet Macaw nest site. From the muddy bank, a path leads through towering grasses and into the shadows of the broadleaf

forest. We enter a cleared area. A pile of burned wooden planks, the chard corners of a blue tarp, and ashy trash denotes this place as a poacher's campsite.

About thirty feet up a tall Quamwood tree, a cavity, slightly smaller than a soccer ball, punctuates the trunk where a branch was wrenched from the tree. Tracks of small holes weeping sap dot the wide pale trunk leading up to the hole we hope is still occupied by a chick. At the beginning of the macaw breeding season, xateros strapped on spiked shoes, scaled this very tree, and stole a young chick to sell on the black market pet trade.

After losing their first chick to poachers, the macaw parents tried to form a family again and laid another clutch in the same Quamwood. The wounds in the tree look old, but has the nest been poached again? The three of us stand around looking up. A gentle breeze shifts the jade fan-leaves of the tree. As we wait, Roni finds a half buried reptile nest occupied by four white, inch-long, oblong eggs probably from a snake. We grow impatient. Roni picks up a fallen branch and bangs on the trunk of the Quamwood. The stick splinters. He tosses it away. No macaw looks out of the hole. We fear the worst and wait.

Through participation and education, community-based conservation rekindles the spirit of human admiration for nature in societies where such principles are usurped for various reasons, such as abject poverty, loss of cultural traditions, or perceived human-wildlife conflict. For example, current outreach activities around Yellowstone National Park strive to help local ranchers consider carnivores in new ways and reevaluate shooting wolves that cross park boundaries. Personally involving people in conservation practices rather than forcing them to blindly comply with government mandates helps create more positive attitudes towards conservation and its goals. This reflects Arun Agrawal's theory of

environmental subjectivities, which posits that people can come to think and act in new ways in relation to the environment if they help conservationists in monitoring, enforcement, and regulation. This participation generates "concern for conservation that renders environmental protection a moral act." If people believe protecting wildlife, habitat, or ecosystems to be morally correct, then they are more likely to actively support and participate in conservation. Community-based conservation strives to make conservation not only a moral act in respect to nature, but in respect to humans as well.

Rather than marginalizing indigenous cultures, community-based conservation can integrate their ecological values and spiritual beliefs into management plans and provide legal power to protect them. For example, the Wunambal Gaambera people of Australia identified ten of the most important things for their management of the Uunguu Indigenous Protected Area including "*Wanjina Wunggurr* Law – our culture, Right way fire, *Aamba* and other meat foods, Bush plants, Rock art, and *Mangguru* (marine turtles) and *Balguja* (dugong)." These targets address elements of prime importance to the aboriginal people for their identity and livelihoods, but also encompass biodiversity important for conservation. People living around community conserved areas in Nepal adjusted, but essentially maintained, their traditional forest use practices by planting firewood and fodder trees on their homesteads from community managed seedling nurseries in response to conservation restrictions. Scientists benefit from working with locals who may know the favored foraging ground or habitat of endangered species and other important life history information. By integrating local knowledge and providing means to incorporate traditional practices in new eco-conscious ways, community-based conservation can nurture a positive attitude towards conservation while respecting indigenous peoples. Additionally, understanding what is

important to local communities and what can motivate them in support of conservation practices is an integral aspect of effective community-based conservation.

People cannot fix what they do not know is broken. For example, if they do not perceive a link between a physically disturbed coral reef habitat and decreased fish catches, they will not take action to improve reef quality. Following Agrawal's theory, marine reserves established around the island of Negros Oriental in the Philippines involved the community in data collection by asking fishermen and their wives to record their catches in a participatory fish monitoring survey. Biologists lead regular public workshops, which showed the locals their collected data and illustrated how the marine reserves actively increased everyone's fish yields over time. Involving locals in data collection not only helped to supply needed ecological information, it fortified their commitment to the conservation project. The locals could now see why coral destroying fishing methods such as using dynamite and sodium cyanide were illegal. Before community-based conservation was introduced many locals believed corals were just stones! If residents understand how a management program will solve a problem significant to their lives, such as decreased fish catches, they will be more willing to participate in it. By increasing marine biodiversity and improving the livelihoods of local fisherman, the conservation efforts around Negros Oriental proved to be both biologically and socially successful.

Last year, due to heavy poaching, only a single Scarlet Macaw managed to fledge in the Chiquibul. All the other chicks were either stolen by poachers or killed by predators. So far this year, the count is up to five fledglings and two nests still have chicks. The work Roni and his team started this season, patrolling the jungle and monitoring the macaws, seems to be

working. While other populations of Scarlet Macaws exist in Central and South America, extensive deforestation separates the remaining pockets of parrots, putting the entire species at risk. In a population so small and isolated, every individual matters.

In his 2010 TED Talk “How Poachers Became Caretakers,” conservationist John Kasaona said “We were successful in Namibia because we dreamed of a future that was much more than just a healthy wildlife. We knew conservation would fail if it doesn't work to improve the lives of the local communities.” Namibia is perhaps the largest success story of community based conservation as the country hosts 60 conservancies that manage and protect over 13 million hectares of land and holds the largest population of free-ranging black rhinos in the world. Integrating human livelihoods with wildlife creates a mutually beneficial situation. Inspiring initial engagement with community-based conservation may encounter resistance, but once people become invested and involved, the system becomes self-perpetuating.

This proved true for the community cooperative in Ostional, Costa Rica’s egg harvesting project (EHP) centered around the legal, commercial harvest of Olive Ridley Sea Turtle eggs. Since these sea turtles compete with one another for nest locations, regulated egg removal is seen as biologically sustainable and beneficial for the sea turtle populations (Campbell, Haalboom, and Trow 123). This regulated harvest provided both food and income for locals.

Community members in Ostional were surveyed at the initiation of the project in 1995 and nine years later to determine local attitudes and awareness of conservation practices. As expected, people frequently mentioned economic and community benefits as

the best thing about the EHP after its initiation. Most community-based conservation relies on economic incentives to generate support in the community to establish the program and motivate participation. Remarkably, after only nine years of the EHP, 37% of villagers ranked protecting the turtles as the best thing about the EHP as compared to a scant 5% in 1995 (Campbell, Haalboom, and Trow 126). Rather than performing conservation solely for the sake of money, more people in Ostional now liked the program for its effect on wildlife. Watching sea turtles scoop their fins across the sand, deposit their precious eggs, and later the freshly hatched babies wobble their way to a life in the sea, increased people's dedication to conserving them. In a way, closely observing local wildlife can make you feel like those animals are part of your home, part of your extended family. To then ignore their plight would seem morally reprehensible.

After participating in the project, people in Ostional displayed more knowledge about activities to protect the sea turtles. For example, 82% of locals surveyed cited beach cleaning as beneficial for protecting sea turtles in 2004 as opposed to only 18% in 1995. For the people of Ostional, community-based conservation clearly increased the intrinsic value of sea turtles in their society and spread knowledge about good conservation practices. This study confirms that the simple act of participation can create a positive feedback loop encouraging commitment to conservation. Once people have a personal connection with a species or area they feel morally obligated to ensure its continued existence not only so that their children can enjoy it, but for its own immeasurable value. If people become personally invested and recognize the ecological value of a species, such as rhinoceroses, corals, or sea turtles, then they will take action to further its continued existence.

An empirical study from Nepal by Mehta and Heinen found that community-based conservation shapes favorable attitudes towards environmental stewardship and that environmental education can play a leading role in this shift. The study focused on two conservation areas, Annapurna and the more impoverished Makalu-Barun, which have largely adopted community-based conservation approaches to policy formulation, planning, and management. Surveys in Annapurna, found that most residents said they really appreciated the economic and social incentives, such as community forestry and development programs, mostly likely due to thier ability to alleviate poverty in the area. Even so, 30% of respondents indicated that they liked the conservation area because of what it did for wildlife, while 26% mentioned its role in creating general awareness among locals toward environmental problems. Once again reflecting Agrawal's theory, the overall favorable attitude towards conservation results from the fact that community forestry in conservation areas is participatory and residents develop a sense of ownership with legal rights to harvest forest products for subsistence or sale. People linked their higher standards of living, or ability to feed their families on a regular basis, to the community conserved area and to the wildlife that brought conservation initiatives to their village. In other areas of Nepal, people living around standard fortress style preserves still display negative attitudes toward the practice of conservation because unlike community managed areas, they receive no direct benefits.

For community members not hands-on involved in conservation, direct environmental education can provide an ecological understanding of how to incorporate conservation into people's daily activities. In the Nepal study, better educated residents were significantly more likely to hold favorable attitudes towards the Makalu-Barun conservation area because high

schools teach conservation education tailored to generate awareness and interest in local ecology. In contrast to people with little or no education, high school graduates showed better comprehension of the social-ecological importance of the conservation area, and held it in high regard. However, not everyone in this poverty-stricken region completes their high school education.

Rather than ignoring the uneducated populace, alternative forms of environmental education, such as adult literacy classes for women, study tours, audiovisual displays, and street theater performances became part of the project in the Annapurna conservation area. Here, education level did not have a significant effect on positive attitudes towards conservation because more people were aware of its importance due to these outreach programs. Disseminating environmental education through a combination of alternative teaching and the school system appears most effective in generating a sense of stewardship and appreciation for wildlife.

Suddenly, we hear the unmistakable grating of calling macaws. A pair of feathered rainbows perches across the river. In a moment of held breath, our attention snaps back to the tree. Vivid red feathers, curved ivory beak, and cornflower blue eyes – a healthy Scarlet Macaw chick peeps from the hole. The chick tilts its head to gaze down at us, then across the water. We whisper our excitement and walk slowly away from the nest so the parents feel safe to approach.

Farther from the tree, observe as the adult pair flies together, azure wingtips nearly touching, and land near the nest. The chick continues to watch. After a while the female, we can tell because she has a ragged tail from being squished in the nest hollow, flies over to

perch on the tree cavity's rim. She pauses as if listening, and then slips inside. The mother sticks her head out, gives us a long gaze, and then rapidly nods to regurgitate food. She bends down, and I see mother and baby link beaks. After a few minutes she exits, but then reenters a little later for a second feeding.

Roni estimates the chick at a month and a half old and ready to fledge in another two weeks. Once young parrots leave the confines of the nest they are free from the threat of poachers. At this point in the year, the majority of the Belizean macaw population has already moved deeper into the jungle to find more fruiting trees. Further up the river from this nest lives another pair with a chick under the same delayed circumstances. This late in the season, parents have to fly farther to provide food for second clutch offspring.

Environmental advocate Rachel Carson writes in *The Sense of Wonder*, "A child's world is fresh and new and beautiful, full of wonder and excitement. It is our misfortune that for most of us that clear-eyed vision, that true instinct for what is beautiful and awe-inspiring, is dimmed and even lost before we reach adulthood" (2). Unlike most adult community members, children constitute a captive audience in the school system, which makes them prime recipients for environmental education to feed that sense of wonder. Children represent future environmental stewards and their minds and attitudes are more malleable than adults. According to Vaughn et al., "environmental education should be a continuous learning process where individuals become aware of their environment and acquire knowledge, values, skills, and experiences to solve environmental problems for present and future generations" (12). This awareness can motivate active participation in community-based conservation. Unfortunately, it can take decades before schoolchildren become

environmental policymakers, but that does not preclude them from influencing the generation currently in power. Children can affect change by spreading environmental concern and knowledge to other community members.

The small town of Quebrada Banado in Costa Rica is located within the home range of the nation's second largest population of Scarlet Macaws. The wild rainbow plumed parrots fly daily over the town, feed in trees close to homes, or nest in nearby tree cavities. In this town, elementary school students received a one month environmental education course on Scarlet Macaw conservation and natural history. Students were not graded on assignments, but were encouraged to ask parents for assistance on homework projects which often involved informative coloring books about the birds. The study administered a pretest and two posttests to the young students, their parents, and a control group of other adult community members. The study found that when comparing correct responses between the pretest and second posttest, students improved significantly on 67% of questions, parents on 52%, and the control group on 29%. This suggests that students learned and retained knowledge on Scarlet Macaws from the school program and passed their learning on to their parents. The control group most likely increased their understanding of Scarlet Macaw life history and conservation status by chatting with their neighbors. Even though children cannot actively participate in community-based conservation decision making, they can influence those with the power to do so.

Additionally, the structure of environmental education can influence attitudes towards conservation. While some questions on the multiple choice test referenced macaw biology, such as how many eggs they lay (four), other questions directly addressed conservation issues like asking who is responsible for local Scarlet Macaw protection. Another question

asked “What would you do to protect the Central Pacific Scarlet Macaw population?” By using the word “you” the question puts the responsibility directly on the test taker. Requiring children and adults to think about their role in conservation creates a sense of personal obligation. Another question asked what benefit Scarlet Macaws bring to the community with the correct answer being both tourism and the beautification of the area. Rather than seeing nature only as a resource or commodity, the test asks students to appreciate its intrinsic value. Questions like this challenge people to consider Scarlet Macaws as something to be proud of and treasured. This kind of perspective leads to community members taking an active role to integrate conservation practices into their daily lives such as planting a tree or reporting poachers.

Education can also foster positive attitudes towards conservation even through indirect pathways. Ecotourism can play a role in community-based conservation by creating a market for practicing conservation and by employing locals which can economically stimulate the community. Like in Namibia, if people’s livelihoods depend on the existence of protected wilderness then they are more personally invested in seeing that wilderness conserved. Plus, employment as game wardens or tour guides can increase local knowledge about ecology and conservation. For example, in the aforementioned Scarlet Macaw education study, the control group already had a well-developed knowledge base on Scarlet Macaws and on average scored 73% correct on the pretest. This could be due to the fact that 80% of the working population was involved in local tourism. However, not all areas have the infrastructure for ecotourism and it might do more harm than good in some instances. Members of the community involved with the sea turtle egg harvesting project voiced concern about tourists not wanting to pay fees to visit the nesting beaches and the impacts of

tourism development and land speculation on the economy, community, and environment. In those cases, other incentives can motivate support for community-based conservation. If people feel a sense of stewardship and believe that the wild lands and animals belong to the community then they will be less likely to let others, like poachers or oil companies, take from them.

Contented with the safety of our Scarlet Macaw chick, we pitch tents in the poacher's clearing near the Quamwood. As dusk settles we hear the *cow-cow* of a collared forest falcon, the soft sounds of a mottled owl, some *hoo-ing* doves, a chorus of croaking toucans, and the rattling, shaking, sawing, and chirping of insects – a sound so constant it becomes white noise. Across the river, a troupe of spider monkeys breathes long human-like *whoops* from the treetops. A little nearer, the gruff mumblings of a macaw.

SECTION 7:

INTEGUMENTUM COMMUNE

Poetry

Bite the Bullet

feel enamel crack
under the smooth
metallic taste
like blood
of licked wounds.
hold that silver hornet
of unsaid
in place.
feel it buzz
to your roots.
clamp down
until it dies,
and you die
a little hornet sized hole
too.
a lick of venom
in your open wound.
clamp down,
or open
up.
let it fly.
let it pierce
a perfect hornet
sized hole
in the silence
between you
and those who clamp
you shut.
let them taste
the metallic sting.
let them swallow
what they cannot
stomach.
watch them crack
and buzz.

Skinning Pigeons

I warm my fingers in the space
between your skin and muscle.
Peel slowly like an orange.
One strip
to the trash.

I cut our translucent connections,
careful not to pierce the sac
holding breakfast.
Cornflakes, dog food, kernels
to the trash.

I place my thumb under your breastbone
and lift up – *slick snap*
like a pop can.
Twist out intestines
to the trash.

I snip tendons,
carve around bones,
collect your tiny slabs of red
in a Ziploc bag.
Save for my
hungry mouths.

My fingers slip
when I pinch
the triangular smoothness
of your heart.
But I pinch again
and take that, too.

Stretch Marks

Not from the miracle of baby, but the ballooning of puberty.

I don't want to hate my body, so I imagine:

Ghost fingers cup my breasts,

A tigress rubbed pale stripes across my lower back,

Lightning ripped ozone trails over my inner thighs,

My knees bend reeds of white grass.

Blood Beetle

Fresh as a drop of blood,
and just as glistening, I watch
a beetle lumber into a spider's trap.
Wrapped in a silk hammock
by arachnid orange and brown
striped stockings, the captive
beetle waves an unbound
scarlet leg, and beckons me
with clicks like lacquered fingernails.
I watch, as smaller duplicate of the spider
spins a web below.

The Barrier of Skin

Mother and daughter stood
on a concrete stoop
outside the shadow
of a recessed arch
waiting for a black door
to open.
For the antique shop to sell
a big girl brass bedframe
hidden horizontal
above the ash grey floorboards
slanted with light
and the dance of dust.

Despite clasped hands,
small enveloped in smooth,
Mother could not hear me
unless I spoke.
Could not see
the swirling headboard pattern
twisted into an open-mouthed face,
a Green Man gargoyle,
unless she saw how I saw.

Brief Animal Encounters
~Japan, 2015

I. *Pheretima sieboldi*

an iridescent
worm
like a blue rainbow
pokes the earth
outside the cave of the sun
goddess
who would not shine
until laughter
coaxed

II. *Myrmarachne japonica*

hunting scent trails
on the banks
of a volcano formed
dragon
brown from recent
rain
an elongated spider
tucks black legs
under its mouth
to mimic
the pronged helms
of warrior
ants

III. *Parus major*

chickadees
pass through
crimson
gates
changing plumage
from colors
seen
on the other
shore

IV. *Macaca fuscata*

fingers grasping
rock edges
a snow monkey
leans forward
touches red
lips
to the rippled
surface
of a pond
while koi
slide cautious
underneath

V. *Felis catus*

one grey
cat stretches
her mouth
hissing feral
among thousands
of grinning
stone
foxes

VI. *Rhincodon typus*

the world's largest
fish
loops behind
glass

VII. *Cervus nippon*

food takes
the wild
out of
wild
with generations
of velvet
antlers
demanding alms

My Mother's Hands

contain
rivers of blue
snakes

that change course
when she moves
mountain and valley

knuckles

spotted with brown
fields
of past sunshine
and so much

grasping

Camber Inward

you can recreate a bird
based on the curvature
of its feathers,
sort the pile by size and shape
fan them on the ground,
just as the thumbs
of human hands
point to the center
of the body,
so do a bird’s
wings camber
inward

Lonely Heart Metaphors

A bird:
blue for sky,
wings for freedom
ribcage trapped.
A song for yearning.
Forever hopping between perch
to water dish,
to seed dish,
to perch,
water
seeds
perch
preen
sing
die.

A tortoise:
Plodding with stolid purpose.
Eating life one leaf
at a time.
Shelled in apathy.
Spring a heave
to mount.

A human:
Underneath the presentation
of attire,
shaking at the slightest
gust against
naked skin.

A dog:
In a spiked collar
and with stiff ears.
Snarling and snapping
when anyone approaches,
a trained response
to guard
the pup cowering within.

A ground squirrel:
Curled into a ball.
Furred tail warming nose,
hibernating

until the touch
of thaw.

Birding Ada Hayden Heritage Park
~Ames, Iowa – February

One song sparrow, un-singing.
Two puffed nuthatches
investigating clefts in bark.

A mouth of black water yawns
in ice thick enough for fishermen
to cut.

Countless brown globes of Canada
geese sleep the edges, or glide waters
with unidentifiable ducks.

Nine white trumpeter swans on ice,
necks curved around backs,
tucking beaks into warmth

against negative five with wind chill,
I have feathers of my own,
a layer of down – goose? duck? –

One swan wears a red necklace,
banded numbers tell her story
from the mouth of a local cyclist.

She nested nearby
until a car killed her family.
Now she broods farther from the road.

Gullar Movements

A salamander's heart beats in her throat.
She rocks her babies
with hummed vibrations,
aerating them to grow
kicking and squiggling in transparent eggs.

A salamander absorbs moisture from her surroundings,
expanding her vertebra for storage.
She physically shrinks
as she releases her own body water
to dampen gelatinous young.

A salamander's sticky skin has antimicrobial properties.
The clutch hangs from the ceiling
like a grape cluster.
Slowly they spin as she rubs
her whole body to bathe them.

A salamander eats infected eggs,
to protect her remaining babies.
Reabsorbing the lost one's nutrients,
she uses them to swaddle new eggs
already forming in her belly.

How to Organize Recollection

I. Chronologically

Looking for insects in amber
Auntie Bobby wears violet and pearls

Cool grass tickles bare feet
A laughing leap through sprinkler fanned water

We hug in a dream after the funeral
I write in red to comprehend my heart

Scotch like warm honey slides to my belly
A ginger cow chews cud

The chain breaks again
Mud oozes over the tops of my boots

I aim the pellet gun through lime plastic sights
Scrubbing pigeon blood from beneath my fingernails

The sun dips winter yellow
Reindeer coats turn from chocolate to snow

Bruises bloom on shins as I crawl under machinery
Breathing the sky from the top of a windmill

II. Categorically

We hug in a dream after the funeral
Auntie Bobby wears violet and pearls

I write in red to comprehend my heart
Cool grass tickles bare feet

Scrubbing pigeon blood from beneath my fingernails
A laughing leap through sprinkler fanned water

Mud oozes over the tops of my boots
Scotch like warm honey slides to my belly

I aim the pellet gun through lime plastic sights
Looking for insects in amber

The chain breaks again
Bruises bloom on shins as I crawl under machinery

The sun dips winter yellow
Breathing the sky from the top of a windmill

A ginger cow chews cud
Reindeer coats turn from chocolate to snow

III. By Color

I write in red to comprehend my heart
Scrubbing pigeon blood from beneath my fingernails

A ginger cow chews cud
Looking for insects in amber

The sun dips winter yellow
Scotch like warm honey slides to my belly

Cool grass tickles bare feet
I aim the pellet gun through lime plastic sights

Breathing the sky from the top of a windmill
A laughing leap through sprinkler fanned water

Bruises bloom on shins as I crawl under machinery
Auntie Bobby wears violet and pearls

Reindeer coats turn from chocolate to snow
Mud oozes over the tops of my boots

We hug in a dream after the funeral
The chain breaks again

Growth

is a kind of trauma
we stretch our bodies around.

A gecko peels
old skin, even a layer of the eye,
consumes what it once was
and grows again.

Plants tilt toward strongest
light, their movement
the slow replication
of cells.

Sometimes a tiger swallows
its baby teeth. Sometimes
baby teeth stay embedded
in carrion.

Falcons fast before their first flight,
clutch branches with sharp toes
and beat wings against the wind.

A seedling that does not push
against the pressure of soil
does not leaf into tree.

Breath of Life

To each seed he kneaded into soil
my grandfather whispered:

Con la ayuda de Dios, crecer
recta y fuerte, y sano.

> *With God's help, grow*
> *straight, and strong, and healthy.*

Plants grow in breadth
when you speak with them.

In Judaism, a baby is not alive
until it takes its first breath.

The atmosphere holds
its breath in winter.

With my last breath,
I become soil and fruit.

Breathing out is less painful
than not breathing at all.

To the Soul

When drawing, I always start with the eyes.
The eyes hold life,
in them we see soul most clearly.

We let Suzie eat fresh grass as the vet administered her death.
She wobbled,
folded her long, arthritic horse legs.

I disbelieve art that has no soul.
What it has to say I cannot hear
if the eyes do not speak.

The vet touched the dark globe of Suzie's eye with a finger.
Flat on her side, green pulp in her teeth,
she blinked, the last involuntary movement of life.
We waited.

Audubon only drew from dead specimens,
recreating spark from imagination,
a vision of feathers in motion.

We waited.
A quick finger tap to her sticky eye.
She blinked.
We waited.

What do I draw from death?
What does death draw from me?

It took long, arthritic minutes for her eight-pound horse heart
to stop.

A touch, unblinking
I looked into empty windows,
the figure inside drawn away.

SECTION 8:

ECOTONE

Creative Nonfiction

Sight Desired

I trusted the advice of locals that New Zealand's national symbol lived in the grassy airstrip just outside of town on remote Stewart Island. I met a German girl named Julia at the hostel who also had interest in wildlife, and we made our way to the appointed place around midnight. We switched our single, borrowed headlamp from white light to a dim red glow. In the foggy, moonless night, my world of sight shrank to a small puddle of scarlet extending only a few feet in front of me. We would have to get very close to see our nocturnal quarry, the kiwi.

Artist renderings of the celebrated bird range from realistic to caricature and cover everything from postcards, to t-shirts, to bottle openers. Outside the tourist shops, the flightless bird glints on the back of the one dollar coin and its long-beaked silhouette graces animal crossing signs along roadways. As prevalent as its image is, even resident New Zealanders are more likely to encounter the endangered species in a zoo than in the wild.

Knowing the odds of a sighting were against us, Julia and I spoke in whispers as we entered the shorn grass of the field. Suddenly, we heard a snorting squeal and the quick thumping of little feet as a startled, soccer ball sized, lump of shadow ran around us in a wide circle before vanishing into nearby bushes. A kiwi! Julia and I froze, trying to slow our pattering hearts. We saw one! But not very clearly.

The size of the bird surprised me as I expected a kiwi to fit into my cupped palms. Perhaps my misconception stemmed from my experiences with kiwifruit. Although both the bird and the fruit share fuzzy brown coverings, the similarities end there. Originally named after another avian entirely, the Chinese gooseberry grows on a woody vine and originated in

Asia. In the 1960s, a rebranding scheme by New Zealand growers to expand into the American market stamped the sweet fruit with its new title.

Or, perhaps my size expectations originated from the fact that kiwi lay the largest egg relative to body size of any bird in the world. A single egg can weigh up to one fourth the weight of the female and fills up so much of her body cavity that she must fast a few days before laying because no room exists for food. A puffy kiwi chick matches my palm-sized prediction, but as I found in the field, adults of the Stewart Island variety are shin high.

Julia and I stalked the edge of the airstrip scanning our dim red light over the tall tangled grasses. We heard the rustling of an animal moving in the brush not too far in. We saw nothing.

A high pitched scream mixed with whistles, growls, and hisses shattered the chill night. The hairs rose on the back of my neck. My imagination raced, piecing together a chimera of predatory monsters to make such a cry. My rational brain knew the field guide said male kiwi make a *kee-wee* call and the females are more hoarse. Sometimes they sound like the screams of a woman. In the distance, we heard the eerie call repeat.

While in Central America, I learned that many skilled ornithologists count bird species by song alone. In dense jungles, you may hear the music box tune of the nightingale wren, but never see the tiny brown bird. On the airstrip in New Zealand, I wanted more than just identification. More than just a tick mark on a list. I desired sight to reassure me that this fantastical creature and I share the same space-time of existence.

The mist cleared as a crisp wind picked up. Focused on listening and looking for kiwi, the cold faded to background awareness. We heard several rustlings in the bushes. So

close! We listened to a kiwi move in the tall grasses sniffling for grubs and insects with its long beak.

Julia and I whispered to one another and carefully walked further into the airstrip. We passed the headlamp back and forth scanning, scanning. I kept straining my eyes, willing them to see farther than the reach of our weak red light.

To my right, a swishing sound in the brown grass damp with dew. A measured step, step, rustle, rustle. A beak poking into the roots of grasses. Kiwi whiskers tickling their way in the dark. We stood in silence as the minutes stretched listening to the nocturnal bird, hoping for a glimpse. It seemed just beyond the arc of our slowly panning light.

Julia and I agreed to approach the sound. We tried to synchronize our steps to reduce our own noise and startle factor. Two steps. Three steps.

Finally, our crimson illumination fell on a kiwi. The humped bird looked up revealing its curved beak. Small black eyes reflected our light. I held my breath.

The kiwi returned to poking around. A few times it lifted its head and stretched its neck. The whole bird seemed to shift from a soccer ball to a pear with a long steam for a beak. Could it smell us, but not see us?

Across the field, a Morpork owl called for *moore-pork*. Unthreatened by the little owl, the kiwi continued snuffling the grasses. Julia and I took a few steps closer to see the flightless bird a little better. The kiwi lifted its head and looked right at us. Its beak divided its face in half. Without speaking, we watched the bird trot out of our light range and into the darkness.

Perceiving the kiwi with strained senses makes memories of the event seem almost like a dream. The moonless night, the screaming vocalizations, the brisk wind, the dim red light. Yet, I saw it, and it saw me. The kiwi and I were both real.

Individual, Eusocial, Colony

When cloud droplets freeze, snowflakes form. Atmospheric variations morph them into unique shapes as they fall to earth. Starting in 1885, Wilson Bentley photographed thousands of individual snowflakes through a microscope. His pictures resemble geometric perfection – flowers, stars, hexagons.

Beekeeper Arvin pried out a pane covered in hexagons of honeycomb. He scooped some of the members of our hive into a jar, added powdered sugar, screwed on a mesh lid, and shook them gently. A few minutes later he sifted out some sugar as if decorating cookies. We examined the powder counting miniscule red mites, parasites of the bees, to judge the health of the hive.

A honeybee dusted with powdered sugar flew from the open jar and clung to my black t-shirt. She buzzed her wings, vibrated her body – a smattering of white ornamented an area around my navel. The bee methodically ran her front legs over eyes and antenna. She licked the sugar off her legs with a needle-like, magenta-black tongue. Her hind legs brushed the powder from her fuzzy body, slowly revealing gold like an archeologist uncovering treasure.

Many species of siphonophores bioluminese like blue or green jewels in the ocean. Some deep water species have dark orange or red digestive systems like lightning bolts wrapped in transparent tissues. Some take the form of living chains, individuals clinging together for survival, and are the longest creatures in the world.

Like their cousin the jellyfish, siphonophores ensnare microscopic crustaceans or small fish with tentacles. These gelatinous organisms belong to the Cnidaria group of animals that encompasses corals, sea anemones, hydroids, and jellyfish. Siphonophores are extremely fragile and tear to pieces under the slightest forces.

In 1988, Nancy Knight pulled snowflake samples from a Wisconsin snowstorm. She found two identical flakes of the hollow column type.

All the worker bees in the hive looked identical. I had no hope to find the friend who cleaned herself on my t-shirt two weeks earlier. Hundreds of bees clung to the comb building up wax hexagons, filling chambers with nectar, tending to larvae. My bee friend might be dead, but the hive would not miss her. Any of her sisters can fulfill her role.

The queen is the heart, soul, and ovaries of the colony. If she dies, no more eggs are laid. As the workers slowly perish, no one can replace them and the hive is left empty.

Siphonophores, like the Portuguese Man-o-War, are roving colonies made of many individual organisms, called zooids. The colony starts by budding from a single individual. This creates a chain of genetically identical siblings that grow into different shapes specialized to conduct life’s necessities. For example, some siphonophores grow zooids specific for swimming that cannot eat, and zooids for eating that cannot swim, so they rely on each other. A singular zooid cannot survive without its siblings, and the colony as a whole survives as an entity of individuals.

Caltech physics professor Kenneth Libbrecht charted how different atmospheric conditions cause various documented snowflakes types. Twin snowflakes would have to form under the exact same conditions at precisely the same time; essentially they would live identical lives.

But when I think about snow, it is not the individual flakes I picture, but mounds of it, whole mountains covered in white. Snow gets its power from the collective as in a blizzard, as a raging avalanche, or as snowmelt to feed rivers in spring. Humans are the same way. Through the power of the collective we can leave boot prints on the moon, we can kill millions of people in organized death camps, we can enact change for social and environmental justice.

Evolutionary biologists debate how to classify eusocial species, like ants, termites, wasps, and bees, which live in cast system groups with a single reproductive queen. Does natural selection act on the individual or act on the group as a whole? Is the queen, who passes on genes, the only individual on which selection matters? Conversely, is each bee a unique entity, or should we consider the hive to be an individual organism? In the body of the hive, every individual bee functions as a specialist for the good of the colony, just as my human body consists of millions of specialized cells working together as a whole.

The entire colony functions in the ecosystem as a single organism – living, eating, dying together. However, from an evolutionary perspective, siphonophore zooids arise from polyps (like jellyfish) and medusa (like anemones), structures that are free living animals in other species of Cnidarians. Akin to a eusocial hive, identical snowflakes, or a siphonophore, a

human society consists of connected individuals living the exact same lives. As in a colony of bees, and mountains of snow, the individual has meaning and impact as part of a whole.

New Zealand Biophilia

I used to watch National Geographic and envy the rhinoceros and giraffe—not for their majestic size or lumbering grace across the dry grass savannah, but for the oxpecker birds that clutched to their hides and plucked ticks from their bodies. I wanted that easy-going, flick of the ear and shake of the mane kind of relationship with another creature—a symbiosis of unspoken rules. Not master-servant, not pet and owner, but something different.

My friend Meghan and I clutched the seat backs in front of us as the ferry boat's nose rose to the overcast sky then crashed into the ocean swells. Smiles plastered our faces. It felt like a Disneyland ride for the first fifteen minutes, but then my stomach sloshed as unsettled as the sea. Another passenger staggered to the back of the boat to puke into sea spray. Meghan continued to stare ahead as if her concentration could materialize our small island destination from the low, grey clouds and ice-grey water. I pulled out my book to take my mind off the unease of my physical state.

Out of nowhere, the waves calmed and green covered earth rose from teal waters. Several streamlined albatrosses rode the whipping winds, keeping pace with our craft. One albatross cocked its head, seeming to look into the ferry windows. Its feet tucked seamlessly into white feathers, giving the illusion that this sleek bird with long dark wings lived solely on the wind, never touching earth.

The sides of our ferry kissed the dock with a groan. The passengers grabbed bags and hustled off, thankful for the stability of solid ground. A drawing in our hostel guest book of a stick figure with squiggly spaghetti arms and legs accurately depicted how I felt after the ferry ride. Meghan and I stood wiggly limbed in the town of Oban, population 322, main

occupations: fishing and hospitality. This the only settlement on the third largest island of New Zealand located across the perpetually choppy Foveaux Strait south of the South Island. Stewart Island, or Rakiura in Māori, measures only 674 square miles, most of which is a forested nature preserve. After a week and a half touring and road tripping across the two main islands of New Zealand, Meghan and I were looking forward to a few calm days of birding for me and painting for her on this secluded gem.

After checking into our hostel, we walked to the only grocery store in town to grab dinner supplies. With plastic bags swishing in tune with our rain jackets, we paused to watch a whitehaired man in red checkered flannel feeding a small flock of native Kākā parrots on his front porch. The football sized olive green birds squabbled on his railing as he handed out peanuts. Unlike the grating squawks of most parrots, their vocalizations were melodically sweet, and I wondered if they mimicked the sounds of local songbirds.

"Can I take a picture?" I called out, holding up my pocket camera.

"Wouldn't you like to get a closer look?" he asked, ushering us inside the gate.

After a brief hesitation, Meghan and I pushed through the waist-high, white gate and stepped up to the man's porch. The parrots tilted their heads to regard the newcomers.

"Where are you from?" asked the man.

"The United States, the Seattle area," said Meghan. The man nodded slowly. I was not sure how well he knew US geography, or if it even really mattered. We introduced ourselves.

"I'm Bruce," he said. We continued an easy small talk with pauses to admire the birds as I snapped a few photos of the parrots perched along the porch railing. White head feathers scaled into rusty orange around the nape and then blended into the body's dark olive. I

framed one individual holding a peanut—the dark ruby leg feathers created a nice composition with its orange cheek spot as the bird lifted its foot to meet the sharp black curve of its hooked bill.

"They're really friendly," said Bruce. "Here." He gave us each a handful of unsalted peanuts. Meghan and I placed the peanuts on the railing and watched the birds waddle over to pick up the high energy legume treats. Normally, Kākā dine on a variety of foods gleaned from the forest with their Swiss Army knife like beaks ranging from fruits, to cracking open seeds, to ripping bark from rotting logs for grubs, to using their brush-like tongue tips to sup on nectar, or the sugary honeydew produced by scale insects.

"This bunch comes around every evening. I usually leave peanuts or seeds out for them," he said with an unhurried tone common to New Zealanders. "They will even eat from your hand." Sure enough, a parrot landed on his arm and started to pick peanuts from his open palm. "They are gentle, but sometimes the young ones will give you a little nip," Bruce said, shaking his hand to unsettle the offending juvenile parrot. "They are still learning." He smiled fondly at his feathered neighbors.

I had worked as a zookeeper with parrots that were trained not to bite and still had a deep scar from a moody Yellow-headed Amazon on my index finger. These Kākās were wild animals. Despite competing with invasive possums for forage, they did not have to rely on humans for their next meal. But a protein rich peanut makes a tasty treat, and these curious creatures must have learned to exploit the human yearning to connect with nature as part of their regular routine.

Biologist, theorist, naturalist, author, and the world's leading expert on ants, E. O. Wilson, dubs this "the urge to affiliate with other forms of life" with the term biophilia. He

suggests that the subconscious need to connect with other living beings lies deep within our genetic code—that somehow this impulse supplied our ancestors with an increased ability to survive and thrive, and became an innate part of us.

I stretched out my hand with a few peanuts on my palm. One of the parrots seemed to shrug, then flapped its wings to leap and land on my arm. The large, hollow-boned bird felt nearly weightless as it gripped my blue rain-jacketed arm. I held still as the Kākā leaned down with its can opener like upper mandible close to the soft flesh of my hand. The bird deftly scooped up the peanut, then balanced on one foot as it nibbled away at the legume. Meghan and I laughed with wild parrots on our arms and joy stretched my cheeks with a smile.

The story of New Zealand is one of evolution, extinction, and birds. The island nation split off from other land masses around 85 million years ago. During that time the country underwent partial submersion, and then rose again from the sea through the movement of tectonic plates and volcanic activity. Only a handful of hardy species linages survived such environmental changes, such as the Tuatara, a primitive reptile resembling a chubby iguana that roamed the earth with dinosaurs, and now only survives on New Zealand.

This island isolation allowed colonization only by creatures with the power of flight, or those small enough to somehow hitch a ride across the ocean. Thus, birds, insects, and snails proliferated in a land devoid of terrestrial mammals. In fact, the only mammals native to New Zealand today are three species of bats, including ground-walking bats. Birds diversified in unique ways to fulfill the ecological niches normally occupied by furry creatures. The kiwi bird, for example, grows hair-like feathers, hunts for grubs with a keen

sense of smell, and uses its powerful digging feet to excavate burrows, much like a badger. All this combines to make New Zealand a bird watcher's paradise.

My own mammalian presence in New Zealand was somewhat serendipitous. A few months earlier, my friend Meghan managed to negotiate a month off from her work teaching martial arts in exchange for taking over a managerial position which had better pay, but worse hours and more stress. She posted on Facebook "Anyone want to travel with me to New Zealand and Australia for a month?" After several posts along the lines of "I want to, but I can't," I replied with "YES! When?"

My seasonal job working as a zookeeper at The Cougar Mountain Zoo in Issaquah, Washington was ending soon. I had the time, some cash, and a nip of wanderlust. Meghan and I attended middle school and high school together, but only grew close during IB Art our senior year. In the five years since then, our friendship dwindled to happy birthday Facebook posts and occasional catch-ups at holiday parties. However, after a week and a half of hiking through mountain vistas, geeking out together at Lord of the Rings film sites, and encouraging each other's artistic ambitions, our friendship felt rejuvenated as we fed peanuts to the world's most southerly living parrots on Stewart Island.

A little grey and white bird peers intently at me from its perch on a bush's dead branch. Its black eyes glint, taking in my movements and paying special attention to my feet. I scrape my toe across the ground in an arc, overturning pebbles, fallen pine needles, and roughing up the loam. When I pause, the little bird flits down mere inches from my hiking boot, and inspects the disturbed patch to peck-up insects too small for my eyes to see.

I pull out my bird book and identify my feathered friend as a Stewart Island Robin, Toutouwai in Māori. Unlike the American Robins I am used to, this one is about half the size, rounder and grey, and sports a white breast rather than a red one. While the American robin is one of the most common and wide spread birds in the United States, its cousin in New Zealand occupies a space on the endangered species list.

When the bird gleans all it can from my scraped patch, I walk slowly along the path looking back to see the bird hopping around in the scuffs of my footprints. A little further along, another grey bird bursts into the scene chattering and chasing off my feathered pursuer. This individual wears colored bracelets around its legs: yellow over silver on its right, and pink over orange on its left. According to my pamphlet explaining Ulva Island conservation efforts, the silver metal band marks each bird with a unique number. The color above that indicates the year the bird hatched, as researchers banded each generation of chicks a new color. The other two adornments provide quick identification of individuals. The robin's colorful accessories indicate its participation in a relocation and reintroduction program designed to keep the little birds from disappearing.

Habitat destruction for farming and the introduction of carnivorous mammals, such as rats and stoats, by European colonists in the late 19th century drastically impacted many bird species endemic to New Zealand. Evolved in an area devoid of mammalian predators, New Zealand's avifauna possesses few defenses against hungry rats and show little fear of people, as Meghan and I experienced with the Kākā two days before.

This morning, Meghan and I took an eight-minute water taxi ride from Stewart Island to nearby Ulva Island. Our captain handed us leaves from the Muttonbird Scrub plant as we

disembarked—waxy green on one side and velvety, white suede on the other. Written in permeant marker, “Ulva Island Taxi” adorned the soft side.

“Your return tickets,” our captain said with a smile. “When this was the post office, people put stamps on these leaves and used them as postcards.”

This tiny spot of land measuring one square mile used to host the region’s only post office. When new mail arrived, Ulva Island raised a flag easily visible to fishermen on the water, and drew them in to check for letters and socialize. Only the post master’s family lived on the island so its forests remained un-felled, making it a little green haven for wildlife. However, introduced rats and deer still did a fair amount of ecological damage.

The little grey robin now pecking around my feet, attests to a shift in attitude from exploitative apathy to concern for the environment. The descendants of colonists now work to preserve that which makes New Zealand so special. After intensive trapping efforts, conservationists declared Ulva Island rat-free in 1997. South Island Saddleback (Tieke), Yellowhead (Mohua), and my little grey friend the Stewart Island Robin (Toutouwai) were once locally extinct, but through reintroduction efforts they now sing in Ulva’s forest again. Other rare avian residents calling Ulva Island home include, the Stewart Island subspecies of Southern Brown Kiwi (Tokoeka), New Zealand’s smallest endemic bird the Rifleman (Tītitipounamu), Yellow-crowned and Red-fronted Parakeets (Kākāriki), and the Kākā. While walking around the island, Meghan and I even saw the nesting burrows of endangered Yellow-eyed Penguins, the holes scooped out of the soft dirt under tree roots a fair waddle away from the shore.

To keep Ulva Island rat free, visiting vessels, like our water taxi, routinely check for stowaways. But since rats can swim across open ocean for over half a mile, the island

preserve maintains a series of traps, which catch several sharped-toothed invaders every year. These careful measures make Ulva Island a haven for birds and a birder's heaven. Certainly, New Zealand's endemic animals benefit from our biophilia, as do locals like Bruce, and tourists such as myself.

As I watch a male Bellbird belt out a bubbling song, my hands feel frozen to my binoculars. I layered with fleece and a rain jacket, but a brisk wind makes me wish I had thought to pack gloves.

Meghan left on the noon water taxi, but I wanted more time on Ulva Island so I decided to stay until the next crossing at 4:00 PM. I complete each walking trail on my map, and double up on some, trying to keep my blood moving, but inevitably I stop to watch birds. Surrounded by the unfurling green of tree ferns and damp moss covered logs, the sounds of birdsong and cicada sawing, I feel like the only human on the whole island. At least until an older couple traipses past, and I spot a tour group through the foliage.

Stewart Island Robins keep me company, and I make a game of noticing when I pass from one bird's territory to another. A quick fluttering chase and a bird returns to me with the leg bands changed. I make sure to scrape dirt for each new robin – a gift for its companionship.

I would not say the little grey robins are tame, or jaded to human presence like city pigeons. Instead, they strike me as wild, resourceful, and utterly lacking in an instinctual fear of people. To them, I am a coveted source of food.

However, helping the Stewart Island Robin forage seems different than feeding bread to ducks in the park, or even having a wild Kākā take imported peanuts from my hand. I feel

part of the robin's ecology. I feel like a grazing cow kicking up insects for cattle egrets. I feel accepted as a string in the local food web. I feel accepted by nature, when so often while walking in the woods back home my upright presence and forward facing eyes of a predator scares away wildlife, unless I am cautious or lucky. The glistening attention of these little grey birds strikes something deep within me. I have become the giraffe, and the robin the oxpecker.

I wonder if the robin's behavior evolved by foraging in the footsteps of New Zealand's largest land animal, the now extinct Moa. The shaggy-feathered, long-necked bird with dinosaurian toes measured 12 to 14 feet tall and lacked even vestigial wing bones. When the Maori people arrived on New Zealand, they found the dimwitted Moa made easy feasts. I can only imagine the size of those drumsticks! Before the arrival of humans around 1280 AD, the flightless birds' only threat came from the gigantic Haast's eagle. It took only 200 years or so of human interaction to cause both bird species to go the way of the dodo. Perhaps to the Stewart Island Robins, the two-legged shuffling gait of sightseers stirs something in their genetic memory. They stir something in mine.

I can't help but consider the Stewart Island Robins as friends, however brief our interaction. Aristotle discussed the concept of philia as friendship. Specifically, he evoked the idea of reciprocity, and how both parties benefit from the relationship, but especially in terms of happiness. I don't wish to project my own feelings upon the robins, but they certainly give me joy.

On the water taxi leaving Ulva Island the captain stops so we can admire albatross. Two Mollymawks and a Buller's Albatross glide over and land on the water, tucking up their long

wind-riding wings. White feathers shade to soft grey around the eyes and yellow striped beak, as if smoothed by the touch of an artist. All 22 species of albatross are listed under some level of concern ranging from critically endangered to vulnerable. The large birds bob in the water around our boat, hoping for handouts.

"They like to follow fishing boats for scraps," says the captain. "Have you got your pictures?" he asks after a few more minutes. I nod and sit again with the rest of the passengers.

So many of our relationships with animals seem to revolve around food, both through eating and feeding. The lure of food may help loosen instinctual caution when confronting other species, and perhaps a full belly is a way to happiness. The theory of biophilia posits that our human attraction to flowering plants stems from the fact that, to our hunter-gatherer ancestors, blooms could indicate future sources of fruit or berries. Whether feeding albatross from a boat, or robins on Stewart Island, perhaps seeing other creatures partake in an activity that we enjoy, is what delights us.

Later that evening, Meghan and I walk over to the wharf as the sun begins to tinge the sky with orange. A few whitehaired locals sit on lawn chairs patiently watching the rocks. As we join in the waiting, Meghan practices martial arts forms under the eaves of the ferry building.

"Woah-ho! I better watch out!" says a grizzled old man with an etched face, which Meghan later confides she took a photo of for sketching. We join in his laughter and begin chatting.

"You here to see the penguins?" asks the man we learn is a freight captain. I bend to pet his scruffy Jack Russell Terrier.

"Yep," says Meghan. "We heard this was the best spot."

"You're in the right place!" he replies. "A little family of four lives in that rock crevice there." He points to the barnacle spotted boulders wet with rain and sea water. "They go out fishing all day and come back to rest at sundown. Keep your eyes open. They come in quick!"

"I see one!" says Meghan pointing to the incoming tide. Sure enough, half-a-minute later a Little Blue Penguin, also known as a Fairy Penguin, and the smallest of its kind in the world, flops up on the rocks. Approximately the size and shape of a football, it totters and slips, ungracefully picking its way to the rocky alcove. Several minutes later another tiny penguin makes landfall. Its navy-blue back, white belly, and pink feet quickly disappear into the rocks. Fully dark now, our fellow penguin watchers pack up their chairs and head back to their own homes.

As Meghan and I walk back to the hostel, I muse on the relationship Stewart Islanders have with their wild neighbors. Bruce and the Kākā. The fishermen and the albatross. These penguin watchers. Maybe the fearlessness of the birds mixed with small town island life helps tune the locals to their natural surroundings, creating not just an awareness, but a fondness. Some sort of bond, not pet and owner, not entertainer and entertained, but something more. I think of my own experience with the Stewart Island robins. Perhaps the feeling is ecological. Perhaps it is whispered in our genes.

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POETRY

"Contemplations at Children's Peace Monument" is inspired by a visit to the Hiroshima Peace Memorial Museum in Japan. To learn about the origin of paper crane folding and its relation to the atomic bomb, visit http://www.city.hiroshima.lg.jp/shimin/heiwa/crane.html.

"The Hole in the Ground that's on Fire and the Water We Wear and the River We Eat" is true. For more information on what we did and are still doing, check out Natasha Geiling's article, "This Hellish Desert Pit Has Been on Fire for More Than 40 Years," published on the *Smithsonian* website on March 9, 2016. Also, read Mark Synnott's "Sins of the Aral Sea" published on the *National Geographic* website on 9 Mar. 2016.

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Some phrasing and language in "The Electrical Eel" was lifted from *The Naturalists' Miscellany* by George Shaw, London, Nodder & Co. 1789.

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